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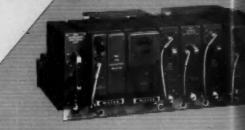
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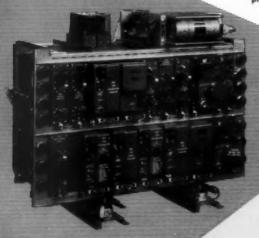
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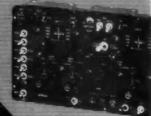
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leil McElroy is bold, dynamic and decisive, big man who gets things done quickly, rees heavily on his experts' advice, then acts. ead Pentagon Profile, page 33.



licones solve hydraulic-fluid heating

reaking through the thermal barrier, a new E-developed material promises higher thrust-eight-ratio engines, temperature-resistant thes. Full story starts page 41.



ow to automate short-run production

approached on a systems-planning basis utomation is not only feasible, but is ecomically justified. For a complete analysis a recent study, see page 51.



ast and West race for turbine lead

oeing rolls out first 797 as Reds unveil a 00-passenger turboprop. Electra nears rollout and Douglas DC-8 is on final assembly line. or complete analysis see page 61.



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Coming, next issue . . . first in a series of articles by James J. Haggerty, Jr., former military editor of American Aviation and now a contract writer for Look magazine. Haggerty, under special contract service to American Aviation, will offer its readership first-hand editorial analysis of current military topics as a special feature. Look for the first of this series in the December 2 issue.



ARTWORK BASED ON OFFICIAL U. S. HAVY PHOTOGRAPS

NEW HORIZONS ARE AHEAD FOR MANNED AIRCRAFT

No matter how far man's technical ability may soar, he himself has one faculty no machine will ever duplicate—the ability to make a command decision.

This unique power to capitalize on opportunity—implemented by higher-performance airplanes—may very well make the manned aircraft of the future our most versatile, flexible and accurate weapon.

America's strategic missiles will be mighty buttresses to our nation's defense. But for maximum security, America also needs a new kind of manned weapon system...as advanced in performance as that now being developed in missiles.

These new airplanes must fly so fast they can strike with little or no warning...so far they can pinpoint any target on earth...so high they can launch a space-to-earth missile.

Such aircraft are even now in development at North American Aviation. Exhaustive studies, in collaboration with the Air Force, have already resulted in a unique design concept for Weapon System 110, an incredibly fast upperaltitude chemical bomber with global range. Other bold new concepts now being developed by North American include a long-range interceptor and the X-15, a rocket-powered research plane that will carry the first man into Outer Space.

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NOVEN

Is There Real Understanding at the Top?

WE DON'T KNOW who writes President Eisenhower's speeches (we wish he would take a stab at writing his own) but the net results are not only feeble but very disappointing to those who are looking to the White House for leadership in the era of space.

The President has been insulated for a long time, far more than is generally realized. Thus the palace guard holds a position of vital importance. And so it is that developments in the past several months have revealed the shortcomings of the men

who advise and counsel the President.

We in American Aviation Publications considered it to be a matter of utmost duty and service to the nation to place before the public through the medium of *The New York Times* a sevencolumn paid advertisement on November 7 reprinting in full the text of the editorial in the November issue of *Missiles & Rockets* magazine, companion publication to AMERICAN AVIATION.

This editorial called for *leadership* in the World War III in which the United States is now engaged—the race for technical and scientific superiority. The reaction and response among the public, the press, radio and TV was immediate and

electric.

When the President spoke on the night of November 7 following the upsurge of concern by the people to the launching of Sputnik #2, there was an air of anticipation that the leadership and understanding which have been lacking were finally forthcoming.

It was—but only in part. The belated appointment of Dr. James R. Killian, Jr., president of M.I.T., as Special Assistant to the President for Science and Technology, was on the affirmative

side. No one can quarrel with this excellent decision.

But the person or persons who wrote the President's speech could scarcely qualify as inspired and knowledgeable individuals. Not only was there a reference to the Corporal missile as a big national asset when this out-dated object has long since been out of production, but the speech-writers had the President saying that the B-58 was to be the successor to the B-52, when in fact it is much more of a successor to the B-47 in a new and important speed element.

But the real vacuum was in the field of space satellites. It is obvious that the White House palace guard has no concept of the new era of space, no more than it had some months and years ago, despite the Soviet triumphs. Where in the Eisenhower speech was there an intelligent reference to the importance of outer space penetration and exploration? Where was there a hint of encouragement that this country is aware of the vital importance of a

space program?

The American people are rightfully concerned about this country's ability to organize its vast resources toward a program of achievement in missiles, rockets and satellites. Today the Pentagon is pressing buttons that should have been pressed as long as ten years ago. Today the Pentagon is reversing negative decisions made by supposedly-eminent authorities in the past half-dozen years. At long last the Army has been given the green light. There is room for mistakes of judgment—but not as much room as we've allowed to happen. What concerns us most is that at the top there may still be no real understanding of what this vast new space era is all about.

The Other Hand

Mr. Louis J. Hector is the newest member of the Civil Aeronautics Board and his appointment was a good one. He has done a great deal of reading and studying and he writes his own speeches. He is trying hard to make a sound contribution to

air transportation.

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Recently he made a speech in Norman, Oklahoma, which represented a lot of constructive thinking regarding the local carriers. One of his numerous suggestions was that the local carriers should continue experimenting in every way possible with improved methods of local service. He urged a bold but practicable approach of putting new ideas into force.

All this is fine. Much to the point. But we fear this is but one more example of the wide gap between the five Board members and the negative activities of the CAB staff. Mr. Hector should

examine the staff actions during the past year. In almost every single instance where a local carrier experimented along the lines suggested by Mr. Hector, it had its costs disallowed by the staff. Cut off sharply. No dice. Mr. Hector will find that his major problem is nowhere else but in the staff in his own organization and, until that problem is solved, all of the healthy thinking and suggestions are lost to the winds.

Costly History

On Nov. 6, 1957, the Navy's last battleship, the U.S.S. Wisconsin, went into mothballs. The news merited slight attention. But shades of Billy Mitchell! The battleship was obsolete long before the Navy finally accorded the fact sufficient recognition to stop construction of new ones and put the others in storage. And at what great cost!

Wayne W. Parrish



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The J54... designed by Westinghouse as an investment in the defense of America... has passed a major developmental milestone.

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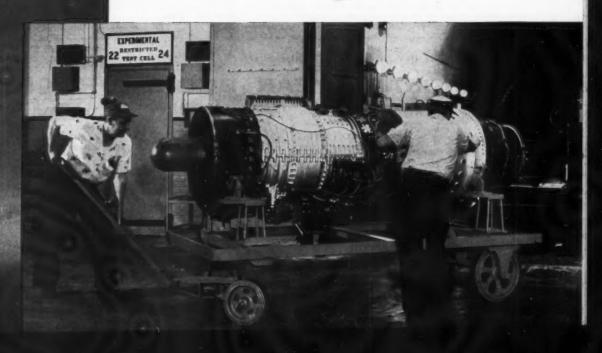
This medium thrust class, lightweight, single-spool turbojet has been designed for economical manufacture and operation. Continuing studies of advanced J54 configurations give promise of further satisfactory performance in many applications.

Successful performance in this Westinghouse-financed J54 program typifies Aviation Gas Turbine Division capability. For J54 application data in convenient TAPE form, or general information on Westinghouse capacity, call your Westinghouse Defense Products salesman or write: Westinghouse Electric Corporation, Aviation Gas Turbine Division, P.O. Box 288, Kansas City, Missouri.

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Accessory producer's plight

To the Editor:

Having just finished reading your excellent editorial in the Special Annual Engineering and Development issue of AMERICAN AVIATION, I am prompted to write and congratulate you for focusing attention on the current plight of the

May I add to your comments one phenomenon in our industry which continues to perplex us, the equipment de-signer and manufacturer, and which is overlooked by the prime contractors. The

phenomenon is this:

We are constantly submitting quotations in meaningless quantities of 1 to 1,000 pieces of a new accessory item. The resulting procurement may be split, and we are not sure just what quantity will actually be released for procurement by the customer.

The important consideration is that we must bid a fixed price under competitive conditions when the accessory item is a developmental product, specifications for which are not finalized or agreed upon. It is the exception rather than the tuie when we have time in preparation of a proposal to accomplish more than a rough layout of the item. With this and some known standards we estimate costs

I think you will agree that this is an economically unsound method on which to base production prices for equipment which, as you say, makes up such an important segment of our aircraft and missile industry. Protection afforded the prime contractor in the way of percentage savings on incentive type contracts or cost production on fixed-free contracts is not passed along to our catagory of accessory suppliers who are operating in a very competitive market.

With the trend toward fewer num-With the frend toward fewer numbers, increasing complexity and greater liability requirements for all airborne systems and subsystems, this risk of the equipment manufacturer will be magnified. Yet we shall not be able, under present conditions, to make even a fair profit unless ensuing production rates are of sufficient magnitude to allow savings

or sufficient magnitude to allow savings in manufacturing costs.

I certainly hope that your editorial will be thoroughly digested by responsible authorities in the Department of Defense, Aircraft Industries Association and in the prime contractor plants. Action taken thereon conceivably would make this a more attractive business and insure the quality and the reliability so necessary in the airplanes and missiles of the future. D. W. ORRICK, Manager, Aircraft Sales, The Aro Equipment Corp.

Liked diversification story

To the Editor:

AMERICAN AVIATION'S coverage of our diversification story and the play you gave it in leading the October 21 issue gave it in leading the (p. 39) mark a new high in our relationships with your publication. I appreciated the opportunity to talk with Henry Simmons personally, and he did a workmanness personally, and he did a workmanness personally. like job on a subject of great importance

Many thanks for your interest in the story and for one of the best magazine

treatments we have ever received. ERLE MARTIN, General Manager, Hamilton Standard Division, United Aircraft Corp., Windsor Locks, Conn.

Finds low-down amusing

To the Editor:

A note of compliment on Fred Hunter's "West Coast Talk" column of low-down on some higher-ups. It made very amusing reading. BERT W. HOL-LOWAY, Corporate Director, Advertising, Publicity, Promotion, Lockheed Aircraft Corp., Burbank, Calif.

Finds us helpful

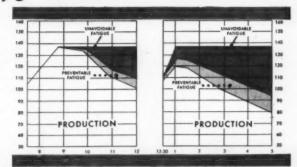
To the Editor:

We have had frequent occasion to realize how helpful your publication is in our constant effort to acquaint American industry with our interest in the ad-vancement and support of scientific research and the interpretation of its findings in terms of military and industrial implications.

As merely one case in point, William Beller's article in your issue of April 8 (p. 48) has thus far led to over 50 inquiries from industry for further than the properties analogy tank data on the rheoelectric analogy tank.

MEL WHITE, Chief, Information Services, Air Force Office of Scientific Re-

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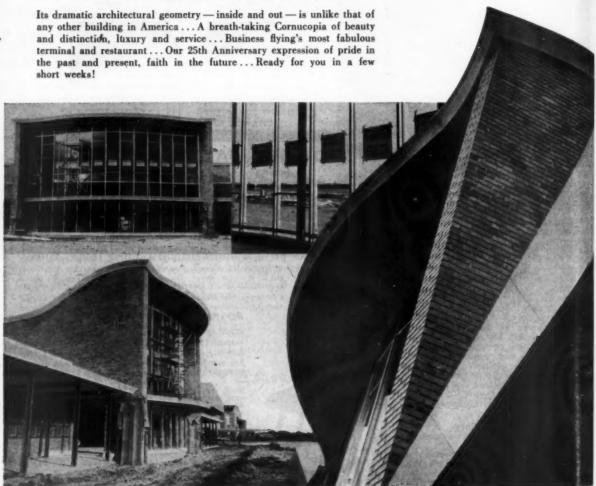








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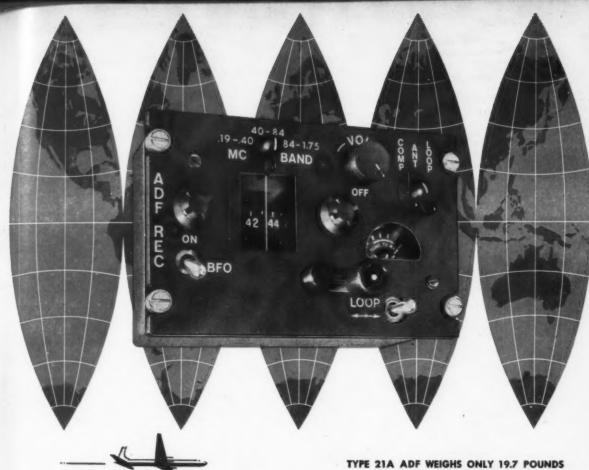
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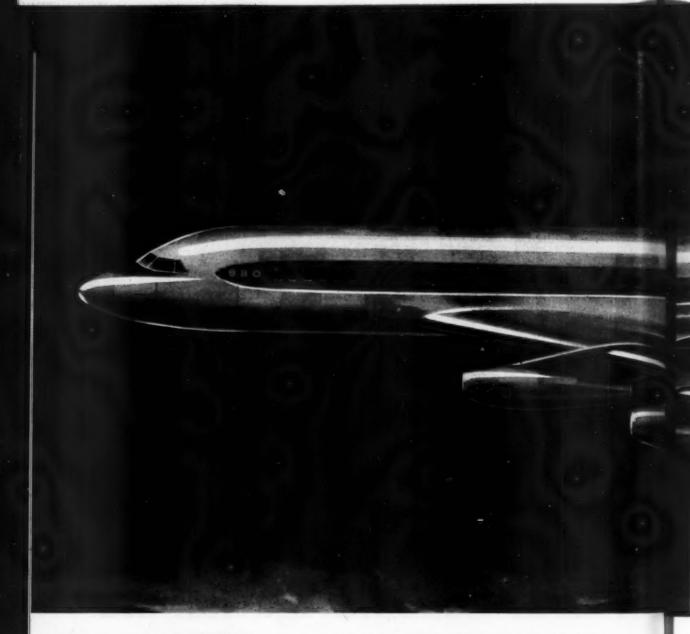
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HEN-WHERE

NOVEMBER

National Aeronautic Assn. annual meeting, Fontenelle Hotel, Omaha, Neb.,

Aviation Distributors and Manufacturers Assn. meeting, Sheraton-Cadillac Hotel, Detroit, Nov. 21-22. ATA annual membership meeting, Wash-Sheraton-Cadillac

ington, D.C., Nov. 26.

AGARD aeromedical panel, Shorcham
Hotel, Washington, D.C., Nov. 26-

DECEMBER

ASME annual meeting, Hotel Statler, New York, Dec. 2-5.

American Rocket Society annual meeting,
Hotel Statler, New York, Dec. 2-6.
Symposium on high temperature strain
gauges, Aeronautical Structures Lab.,
Naval Air Materiel Center, Philadel-

Naval Air Material
phia, Dec. 4-5.
American Rocket Society
student conference,
stitute of Brooklyn Chapter, Hotel
Statler, New York,
Dec. 6-7.
Toline computer conference and

em joint computer conference and exhibition, IRE, ACM, AIEE, Shera-ton Park Hotel, Washington, D.C., Dec. 9-13.

Air Traffic Control Symposium, Franklin Institute Laboratories, Philadelphia, Dec. 16-18.

Wright Brothers Lecture, IAS, Dept. of Commerce Auditorium, and Wright Day Dinner, Sheraton-Park Hotel, Washington, D.C., Dec. 17.

JANUARY

National Symposium on electronics re-liability and quality control, Hotel Statler, Washington, D.C., Jan. 6-8. Annual meeting and engineering display, SAE, Sheraton-Cadillac and Statler

SAE, Sheraton-Cadillac and Statler Hotels, Detroit, Jan. 13-17.

Miami International Air Show and Exposition, Sertoma Club, Master Field, Opa-Locka, Fla., Jan. 22-26.

IAS annual meeting, Sheraton-Astor Hotel, New York, Jan. 27-31.

American Astronautical Society annual meeting, New York City, Jan. 29-31.

Southern California Meter Assn., annual instrument short course, Los Angeles Harbor College. Wilmington, Calif. Harbor College, Wilmington, Calif., Jan. 30-31.

MARCH

ASME Gas Turbine Power Div. conference and exhibit, Shoreham Hotel, Washington, D.C., March 2-6.

Nuclear Congress, International Amphitheater, Chicago, March 16-22.

ARS-ASME joint aviation conference, Statler-Hilton Hotel, Dallas, March 17-20.

IRE national convention and radio engineering show, Waldorf-Astoria Hotel, New York Coliseum, March 24-27.

APRIL

ASMF div. of instruments and regulators

assir div. of instruments and regulators conference, University of Delaware, Newark, Del., April 1-3.

ASMF maintenance and plant engineering conference, Penn-Sheraton Hotel, Pattsburgh, Pa., April 14-15.

ASMF design engineering conference, Literational Amphithents Chicago

International Amphitheater, Chicago,

ASMI AWS metals engineering divisions conference, Statler Hotel, St. Louis, April 15-17.

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SPOTLIGHT

Stainless steel sandwich paneling (steel brazed to metal honeycomb), which played a major part in making the Convair B-58 supersonic bomber possible, will play an even greater role in construction of the WS-110 chemically-fueled bomber.

Boeing reportedly initially designed its entry in the WS-110 competition around the Pratt & Whitney J58, although General Electric was selected to build the bomber's engines.

Growing military interest in the proposal by Doman Helicopters for a rotor system in the 13,000- to 16,000-lbs.-thrust category stems from general interest in reducing helicopter maintenance rather than in eliminating vibration. Doman system is not aimed at any specific helicopter type, such as the Sikorsky S-56, as erroneously reported elsewhere.

Military cutback in jet engine procurement is behind the major product diversification program at Thompson Products, Inc., a principal producer of compressor and turbine blades. Company is directing its abilities and facilities toward fabrication of high-strength, hightemperature alloys for rocket-motor casings, rocket nozzles, highstrength pressure vessels and turbine accessories.

When Air Force finally got rid of its aging XC-99—often called the world's largest land-based aircraft—it was a giveaway. No one was interested in buying the big Convair-built plane, so it has been turned over to Disabled American Veterans chapters at San Antonio, which will maintain it as an Air Force memorial.

Airfield performance of the de Havilland Otter will be considerably improved by incorporation of a new high-lift arrangement soon to be announced. Canadian company has built about 225 of the single-engine transports, in addition to 1,140 of the smaller Beaver.

Airline acceptance of the recently declassified joint Navy-Army cockpit instrumentation program is probably a long way off. Prototype system undergoing military flight tests is a concept, not a completed unit, and the services need more money (present budget is \$5 million) to bring it closer to operational use. Although the system, budgets permitting, may be ready for installation in the next military airplane generation, airlines would require three to four years' flight evaluation before any decision could be reached.

Initial production batch of twin-jet Caravelle transports at France's Sud Aviation will be 50, with first deliveries to Air France starting next year.

Napier's Eland-powered Convair 340 is scheduled to arrive in the U.S. this month. It will fly the Atlantic to Canada for demonstrations prior to continuing to Santa Monica, Calif., where it will start its CAA certification program.

The Canadair liner, commercial freighter version of the CL-44 transport, should be of particular interest to transatlantic operators since it will carry about 70,000 lbs. payload across the Atlantic at a direct operating cost of less than 5 cents per ton-mile.

Civil Aeronautics Administration has issued Airworthiness Directive 57-22-1, ordering a special inspection of certain Piper PA-16, -20 and -22 aircraft by Dec. I to eliminate combustible materials and possible ignition sources in areas aft of the firewall and underneath the forward cabin floor.

Convair is expected to get a go-ahead order for a total of 95 B-58 Hustlers as the initial Air Force inventory of supersonic bombers.

France's Breguet company is planning a U.S. demonstration of its big four-engine Deux Ponts early next year. Aircraft also may tour South America.

Germany's first postwar license-built aircraft has made its first flight. It was the first of 150 Piaggio P.149 primary trainers, being built under license by Focke Wulf.

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AIRTRENDS

- Top USAF procurement officials are privately worried about the impact of their expenditure limitation on lower tier subcontractors. They fear major contractors subjected to a slowdown in payments under cost-type contracts (see page 27) will be tempted to delay payments to their subcontractors, many of whom are small companies with limited financial resources.
- Army has a firm requirement for a high-performance jet observation aircraft, beyond the turboprop being developed by Grumman. Jet requirement calls for speed of Mach. .85, two-hour duration, short takeoff and landing. Three Cessna T-37s on loan from USAF are being evaluated by Army to determine combat techniques with small jets.

Despite USAF protests last year, Joint Chiefs of Staff upheld Army's requirement. Army maintained target-spotting has traditionally been its mission and that jets were needed under its jurisdiction as battle areas expanded in nuclear warfare. However, USAF won a small victory in squashing Army procurement plans for 10 T-37s for the combat evaluation.

Exact scope of the new authority to be granted "missile czar" William Holaday has not yet been determined, despite President Eisenhower's promise that Holaday would have the same power in the missile field that Defense Secretary Neil McElroy now exercises over the entire military establishment. Though Holaday's new charter hasn't been completed yet, it's clear that he will continue to report to McElroy in his campaign to wipe out roadblocks delaying missile development.

While there was general approval of appointment of Dr. James Killian as science and technology adviser to the President, some company officials feared that increase in authority for Holaday might add to missile delays rather than speed the overall program. Commented one official: "In our company we get speed by streamlining the organization, not by adding new layers of authority."

- Newly-appointed chief counsel for Senate missile investigators will be racing against time to get a report to returning Senators in January. New York lawyer Edwin Weisl, who will conduct hearings for the Senate Permanent Investigating Subcommittee, will have only a month to take reams of testimony from witnesses and produce recommendations in a complex field.
- Aeronautical Training Society is making a bid for Congressional endorsement of contract flight training by the Navy. It has sent Senate and House members detailed press accounts of the report of the Navy-sponsored survey on flight training conducted by Robert Heller & Associates. Survey said contract system could save Navy about \$6,924,000 annually. But Navy has fought Heller recommendations, prefers to do its own training.
- Chances are brightening for Congress to lift the \$275-billion debt ceiling that is being blamed for major defense cutbacks. Treasury Secretary Robert Anderson reportedly has approached Congressional leaders, probably about the debt limit. Since sympathy is mounting for increased spending, ceiling may be lifted if President requests. Key factor is the softer mood shown by economizer Harry Byrd (D.-Va.). He won't relent easily, but Soviet missile achievements may compel a more liberal spending attitude by the Democrats.
- President Eisenhower and his advisers are expected to have enough information by Christmas to authorize a new and far more ambitious U.S. space flight program, according to Pentagon sources. If this is the case, it would help assuage the disappointment felt by many over the President's initial speech to the nation this month, in which he was silent about U.S. plans to overtake the Soviets.

As a first step, the U.S. satellite program has been broadened to include the Army's capability with the Jupiter-C three-stage rocket. While this vehicle will be limited to about the same size payloads as the Vanguard, it will at least provide added assurance that the U.S. will be able to get a satellite into space during the IGY, ending Dec. 31, 1958.

DIGEST

Military violently opposes CAB proposal to put civilian administrator in control of all airspace

Civil Aeronautics Board's proposal to place control of airspace in the hands of the Civil Aeronautics Administrator has met with bitter military opposition. The result—a virtual stalemate between civil and military interests as to how airspace disputes should be administered.

It was in this climate that a recent public meeting, called by the Board to loosen the deadlock, was completely boycotted by the military. CAB had paved the way for open discussion with a proposed draft regulation and used the meeting to obtain additional reaction before final action on a regulation.

CAB Safety Director Oscar Bakke presided over the forum at which there was virtually unanimous endorsement of the CAB and CAA proposal. All parties appeared to favor continued use of the Air Coordinating Committee, which currently handles airspace disputes. But the parties present also wanted a more powerful administrator of airspace matters, who would not be limited by ACC machinery or confined to the unanimity rule as it presently exists under this machinery. Civilian users of airspace asked

Civilian users of airspace asked CAB for adequate safeguards built into any future plan for the settlement of disputes with the military. CAA Chief Counsel Robert Boyle mentioned both "civil penalties and the cease and desist order" as possible means to enforce the proposed regulation. Boyle added that he expected full military cooperation in event of a finalized order.

William Becker, operations director of the Air Transport Assn. said the ACC as it exists is "lopsided in

favor of the military" and that civil users of airspace "need more than a voice in the problems which arise." Becker endorsed continued use of ACC machinery but wanted authority designated as CAB proposes.

Max Karant, vice president of the Aircraft Owners and Pilots Assn., favored barring military air shows that interfere with commercial flying. Karant doubted the national defense significance of many of the shows.

Carl Christenson, United Air Lines' flight safety director, charged that certain local military command areas "usurped airspace without regard to due processes to obtain justice." He urged "at least equal voting power and adequate representation" on airspace problems. Christenson complained that the Air Force attempted to set up a bombing range within 20 miles of the Salt Lake City airport.

Others appearing at the meeting included representatives from Air Traffic Control Assn., National Association of State Aviation Officials, Federal Communications Commission, ACC, National Business Aircraft Assn. and the Air Line Pilots Assn.

Defense Department has opposed the Board's proposal from its very inception and has questioned the legality of CAB and CAA to control air-

Opposition stems from a Board move last July to deprive the military of the right to declare vast areas of airspace off-limits to commercial air traffic except in cases involving actual defense of the country from attack or in certain other unusual cases. The

Board hailed this proposal as "a major step in determining how airspace will be used" and added that it is intended to resolve the conflicts that arise be tween the various airspace users.

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Technically, the Administrator would have authority to impose such terms or conditions and limitations as he deems necessary, as well as the authority to modify or revoke such designation where required in the public interest. The Board would be able to review any such action taken by the Administrator.

In opposing CAB, Defense Department stressed its responsibility for the National Defense, and charged that CAB and CAA had not received "statutory authority from Congress" to control airspace. There appears to be a basic reluctance on the part of Defense to place important military matters at the discretion of agencies without the needed background in problems peculiar to the military.

Military opponents to the CAB action also contend that the existing Air Coordinating Committee is able to handle the airspace situation adequately. The group challenges a solution whereby CAB would gain control.

Defense, in attacking the legality of the CAB proposal, calls attention to the Air Commerce Act of 1926 which authorizes the President to issue an executive order for a "setting apart and the protection of airspace reservations in the U.S. for national defense or other governmental purposes." The Department thus claims that any CAB action would place the authority of the President at stake. The CAB, Defense maintains, would be "unwise to put the conflict of its authority and that of the President to test."

Despite military opposition, however, the Board is known to have White House support in its action on the air space authority and, barring top-level preventive measures by Defense officials, can now be expected to pursue early adoption of a regulation.

Airways Board to meet with manufacturers

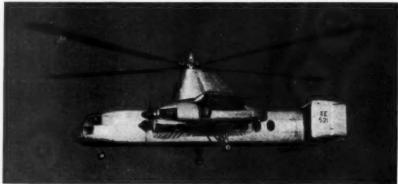
Airways Modernization Board wild discuss its mission and methods with aircraft and equipment manufactures at a symposium Dec. 16-18 at Sheraton Hotel, Philadelphia.

Scheduled to appear at the Franklin Institute-sponsored symposium are Elwood R. Quesada, AMB chairman Louis S. Rothschild, Under-secretary of Commerce; Milton W. Arnold, wo operations and engineering, Air Transport Assn.; James L. Anast, acting AMB technical director, and an unamed representative of Defense Department.

Fee for the symposium is set a \$50. Detailed programs can be obtained by writing: Air Traffic Control Symposium, The Franklin Institute Laboratories, 20th and The Parkway, Phila

delphia 3.

First VTOL transport makes initial flight in Britain



FAIREY ROTODYNE, 48-passenger vertical takeoff aircraft, has made its first flight in Britain. Rotodyne is powered by two Napier Eland turboprop engines which turn forward-facing props as well as a 90-ft.-diameter four-blade rotor above fuselage. For takeoff, compressed air is piped from engines to rotor blades and burned with fuel in tipjet units. Speed is set at 185 mph, range up to 400 miles at gross weight.

22

Air Traffic Control Assn. 'disturbed' at premature reports Volscan system is answer to civil ATC problems

INDIANAPOLIS-Air Traffic Control Assn. has taken sharp issue with recent statements in the press contending that Air Force's Volscan is ready to bring improvement to the civil air traffic control system.

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At its second annual meeting here, ATCA adopted a resolution stating that the association is "disturbed over the implications" of such reports.

The resolution said that while ATCA does not wish to minimize the Air Force's traffic control system's utility for speeding up military return-to-base traffic, it does not want Volscan's use prejudged for civil ATC.

According to ATCA, the limited test at Deer Island in which CAA members participated showed "important deficiencies" that limit Volscan's civil usefulness. Any statement that Volscan is an off-the-shelf answer to civil ATC is "entirely premature."

The organization also went on

record as endorsing early installation of bright display radar in towers for use by local controllers at airports. It noted that radar-to-television scan con-

ATCA said that based on its limited experience with the SPANRAD (superimposed panoramic radar display) system under evaluation by CAA at its Technical Development Center, it believes the technique showed great promise (AMERICAN AVIATION, Oct. 21, p. 67). SPANRAD is a French-developed system produced by Intercontinental Electronics Corp., Mineola, N. Y., an affiliate of Airborne Instruments Laboratory.

The association called attention to a critical shortage of electronics maintenance men during the "midnight watches" and on week-ends at ATC facilities caused by low government pay scales.

version techniques may be the most effective display for this purpose.

lication or service. Westinghouse receives new contract for J34

Westinghouse Electric Co. has received a \$17-million Navy contract to produce two versions of its J34 turbojet engine. One version, the J34-WE-46, will power the North American T2J trainer. The other version is the J34-WE-36, but its application has not been disclosed.

served by R. Spruce Company, and it is intended to extend the services of the new subsidiary, particularly in this direction, Parrish said. The new

activity becomes the 16th AAP pub-

Initial work on the -36 began last fall under a letter contract and deliveries are now being made to Bureau of Aeronautics. The -46 version has a new compressor and modifications permitting use of JP4 and JP5 fuels.

Republic negotiates for Alouette sales rights

Republic Aviation Corp. is nego-tiating an arrangement for marketing the Sud Aviation Alouette jet helicopter in the U.S. beginning in 1958. The French rotorcraft has been demonstrated in the U.S. under Republic sponsorship.

Sud Aviation builds F-84 parts under license from Republic and the two companies have had an informal agreement for several years covering eventual production by Republic of the Sud Aviation Caravelle should demand warrant establishing a U.S. production

Britannia prototype crashes

Prototype of the 300-series Bristol Britannia crashed on November 6 near Filton airport, England, in an approach to the field during propeller tests. All 15 aboard were killed, including Hugh Statham, Bristol's assistant chief test pilot.

Missile-bomber team most potent weapon: AIA

Aircraft Industries Assn. believes that a "wedding of the guided missile with the manned bomber may prove to be a more devastating weapon than the ICBM and less easy to defend against," according to its official publication Planes.

The publication disclosed that reports of ballistic missile firings both in the U.S. and Russia have 'largely ignored the long, hard step between experimental firings and operational readiness at a base."

The ballistic missile's adherence to a course "makes it possible to compute its course and effect an interception," the publication stated. On the other hand "manned bombers can discharge missiles with great accuracy from a point beyond the enemy peri-meter."

Seven civilian schools get AMC contracts

Seven civilian contract schools have received contracts from Air Materiel Command to operate Air Force primary training schools during fiscal 1958. Schools and amounts of contracts are:

Southern Airways School, Bainbridge Air Base, Bainbridge, Ga., \$3,460,290; Garner Aviation Service Corp., Bartow Air Base, Bartow, Fla., \$3,456,191; Pittsburgh Institute of Aeronautics, Graham Air Base, Marianna, Fla., \$4,411,910; Texas Aviation Industries, Inc., Hondo Air Base, Hondo, Tex., \$3,072,901; Anderson Air Activities, Malden Air Base, Malden, Mo., \$2,833,090; California Eastern Aviation, Moore Air Base, Mission, Tex., \$2,881,414; Hawthorne School of Aeronautics, Spence Air Base, Moultrie, Ga., \$2,957,931.

R. Spruce Company becomes AAP subsidiary

Purchase of R. Spruce Company, Chicago, Ill., which has been prepar-ing technical and operating manuals for industrial firms and the government for more than 10 years, has been announced by Wayne W. Parrish, president and publisher of American Aviation Publications, Inc.

R. Spruce Company will continue as a wholly-owned subsidiary of AAP, representing diversification of the services performed for the aviation and other industries by AAP. More than a dozen manufacturers in the aviation industry already are being

Cessna holds price line with '58 Model 172



MAJOR CHANGES in styling and convenience are claimed by Cessna Aircraft Co. in its 1958 version of the Model 172, but the price has been kept at \$8,995. Changes in the aircraft include new interior decoration and sweeping exterior styling. Landing gear revisions have been made for easier handling and better ground stability, the company officials said. Powerplant is 145-hp Continental.

BRIEFS

Manufacturing-military

Curtiss-Wright Corp. has purchased all outstanding stock of H. A. Wagner Co. of Van Nuys, Calif., and will operate the company as a whollyowned subsidiary of Aerophysics Development Corp., a division of C-W.

welopment Corp., a division of C-W.

Merger of Wm. R. Whittaker Co.,
Ltd., of Los Angeles into Telecomputing Corp., North Hollywood, has become effective. Under terms of merger, one share of Whittaker common is being exchanged for four common shares of Telecomputing.

Aerojet-General Corp. will build a closed-cycle gas turbine test facility at Fort Belvoir, Va., and Fairchild Engine & Airplane Corp.'s Stratos Div. will provide the turbo compressor for the facility.

Chandler-Evans, a division of Pratt & Whitney Co., Inc., has established three new engineering and sales offices—in Dayton, Seattle and San Antonio.

Air Proving Ground Command and the Armament Center at Eglin Air Force Base, Fla., are being consolidated into a single center to be operated by Air Research & Development Command. Maj. Gen. Robert W. Burns, commander of Air Proving Ground, has been named commander of combined center.

Transport

Air France, which for the past seven years has used Buchanan & Co. advertising agency, is switching to Batten, Barton, Durstine & Osborn.

CAB reissued the foreign air carrier permit formerly held by Linee Aeree Italiane to Alitalia-LAI. The latter has operated all the Italian airline services since the first of the month and acquired the former LAI route between Italy and New York.

Aeronaves de Mexico plans to to start Mexico City-New York service in early December. The Mexican airline has taken delivery of the first of its two Bristol Britannias and says it plans a schedule of less than six hours.

Swissair ordered a fifth DC-7C for delivery at the end of 1959, and is also buying a DC-6A freighter for late 1958 delivery.

The Flying Tiger Line's all-Constellation freight service inaugurated in October has increased the company's revenues by 34%. Eleven of 18 stations showed gains and four stations more than doubled their traffic volume, FTL said

Financial

Northeast Airlines suffered a net loss of \$2,369,465 for the first nine months of the year, compared with a \$66,378 loss for the equivalent time in 1956. Nine month revenues were \$11,-014,261, up from \$7,826,813 a year ago.

Jack & Heintz, Inc. reports net income of \$838,000, or 92¢ a share, on sales of \$18,209,000 for the first nine months of the year. Last year at the same time income was \$807,000, or 88¢ a share, on sales of \$17,230,000.

Rheem Manufacturing Co. reports net earnings after taxes of \$2,187,067, or \$1.09 a common share, on sales of \$147,561,564 for the nine months ended Sept. 30. For a comparable time in 1956 the figures were a loss of \$2,289,430, or \$1.21 a share, on sales of \$126,450,731.

Olin Mathieson Chemical Corp. reports net profit of \$28,794,421,

equal to \$2.15 per common share, or sales of \$448,505,445 in the nin months ended Sept. 30. Last year eanings for the nine months were \$35,903, 232, or \$2.71 a share, on sales of \$456,907,518.

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Boeing Airplane Co. reports sales of \$1,068,149,816 for the nine month ended Sept. 30, compared with \$671,628,399 in the similar period a year ago. This year earnings were \$24,077, 427, or \$3.60 a share. Last year earnings were \$22,971,285.

Northrop Aircraft, Inc. reports sales of \$281,260,670 for the fiscal year ended July 31. This is down from \$322,513,290 for the previous fiscal year. Net income this year was \$5,522,595, equal to \$3.90 a share, while has year earnings were \$5,567,910, or \$3.62 a share. Backlog July 31 was \$216,000,000, of which 57% was for missiles.

McDonnell Aircraft Corp. reports earnings of \$2,149,331 or \$1.41 per share on sales of \$110,163,973 for the three months ended Sept. 30. Year ago during the same quarter earnings wer \$1,738,978, or \$1.14 a share, on sales of \$57,299,735. Backlog Sept. 30 was \$636,545,719, down from \$711,918,719 last year.

719 last year.

Lockheed Aircraft Corp. reports the highest nine-month sales in company history—\$645,727,000—for the three-quarters ended Sept. 30. Last year at same time sales were \$514,433,000. Net earnings this year were \$11,311,000, or \$3.83 a share, compared with \$10,844,000, or \$3.72 a share, last year.

Trans World Airlines reports as income after taxes of \$2,485,000, equato 37¢ a share, for the nine month ended Sept. 30, compared with \$461,000, or 41¢ a share, for the same period last year.

Bell Aircraft Corp. reports sales of \$151,366,136 for the nine month ended Sept. 28, compared with \$156,197,799 the year before. Net income for the period was \$3,089,271, or \$1.16 per share, down from 1956 nine-month earnings of \$4,489,053, or \$1.73 share.

Parker-Hannifin Corp., forment The Parker Appliance Co., is offering 100,000 shares of common stock purvalue \$20 through an underwriting group headed by Kidder, Peabody & Co. Company adopted its new name when it purchased all the common stock of Hannifin Corp. Sept. 30.

Emery Air Freight Corp. reports net income of \$181,491 for the third quarter of the year. Equal to 26¢ per common share, the earnings are a record high. Year ago earnings were \$145,874 or 21¢ a share. Revenue rost to \$2,902,126 from \$2,345,626 for the third quarter last year.

Collins Radio Co. reports earnings of \$2,699,179 for the fiscal year ended July, down from \$3,195,930 the previous year. Earnings per shard dropped from \$1.96 to \$1.63. Backlog July 31 was \$118 million, up from \$109 million a year ago.

Kaman rolls out HU2K-1 mockup



MOCKUP of Kaman Aircraft's new Navy HU2K-1 utility helicopter being built at the company's Bloomfield, Conn. plant. Design won a BuAer competition. It will be powered by GE's T58 gas turbine.

Vertol 44 solves transport problem for oil industry

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The petroleum industry has a new tool, the Vertol 44 helicopter, to cut manhours, money and misery out of exploratory drilling at remote sites.

The Vertol 44 is a heavy-duty, universal vehicle that makes the sky a 100 mph highway, almost any clearing a landing field. Gone is the need to hack roads in jungle, swamp and mountains. You may need it for these money-saving missions:



Flying Truck: The Vertol 44 carries more than 2 tons of cargo in tropical areas...transports the entire 175,000 lbs. of a drill rig over a distance of 50 miles out and back, in only 56 flying hours. Its 600 cu. ft. cabin accommodates 50% more cargo than any other commercial helicopter, with no problem of load placement.

Flying Bus: Airlifts up to 19 passengers ... 2 typical field crews ... to jungle derricks or offshore drills ... flies exploration teams to otherwise inaccessible spots.

Flying Crane: Hops rivers, ridges and swampland with slingloads of pipe, rig superstructure, large pump components or even mobile field offices.

Flying Tractor: Frees mired vehicles, hauls barges, drags sledges. It has even towed a 3,000-ton ship.

For more information on this multi-purpose vehicle for the oil industry, write to: Customer Relations Department

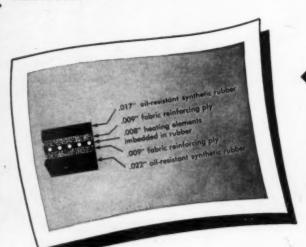
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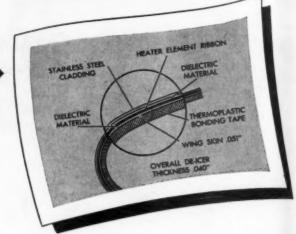
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B. F. Goodrich answers de-icing problems 3 ways

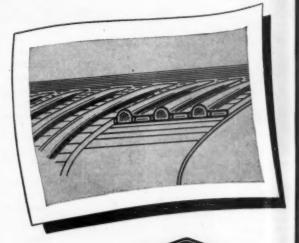
1. METAL-CLAD DE-ICERS—Lightweight B.F. Goodrich metal-clad De-Icers, as used on Boeing's KC-135 stabilizers, are highly resistant to abrasion and erosion from rain and hail. Ribbon-type electrical heating elements are sandwiched between layers of resin-impregnated glass fabric, topped by an exterior skin of stainless steel or other specified metal. Pre-shaped to the contour of the airfoil's leading edge, this De-Icer is attached with an adhesive bond.



3. PNEUMATIC DE-ICERS—B.F.Goodrich Pneumatic De-Icers offer the best-method of ice removal for large areas. Small, rubber-reinforced fabric tubes, built in line with the air stream, inflate and deflate to snap off ice. This chordwise tube arrangement used on planes such as Lockheed's Super-Constellation series and the Grumman Albatross, smooths the flow of air over airfoil surfaces during the brief inflation period. This type of De-Icer is also being used on radomes because its pneumatic operation offers minimum interference with the radar signal.



2. HEATED RUBBER—B.F. Goodrich electrically heated rubber is a lightweight method of supplying heat for ice control in localized areas such as air intakes, cowls, propeller blades and spinners. Typical applications—Lockheed's Constellations and C-130. Heating elements arranged for proper heat pattern are sandwiched between thin, flexible sheets of rubber to fit complex curves or flat surfaces. Power density can be as high as 40 watts psi—overall thickness is small as .030".



For answers to your own specific ice problems, contact —



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Defense financing

New McElroy directive sets 80% payment limit in cost-reimbursement contracts: AF renegotiation may require \$250 million industry outlay

by Henry P. Simmons

THE DEFENSE DEPARTMENT this month disclosed new details of its program to curb cash outlays by the military services and at the same time promote greater capital participation by contractors in military work.

Most important segment of its program was contained in a directive dated Nov. 1 and signed by Defense Secretary Neil McElroy. Stripped to its essentials, the directive provides that all future cost-reimbursement contracts negotiated by the services must be limited to payments of not more than 80% of costs during the period of performance, with full payment delayed until completion of the contract or specified portions of it.

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Traditionally, companies working under cost-reimbursement contracts have received 100% of their costs as they presented their invoices to the government. The new rule means they will have to put up a substantial chunk of their own or borrowed funds during the period of contract performance.

But the McElroy directive, desig-

nated No. 7800.6, also makes it clear that the extent of the contractor's capital investment will be recognized in fixing the fee. This means that contractors working under cost-reimbursement arrangements in the future can expect higher profits than they have received in the past-if only to compensate them for the interest they will have to pay in borrowing funds to support their operations.

Effect of the directive is to wipe out most of the real differences which have previously existed between fixedprice and cost-reimbursement types of contracts. While the two forms of contracts will probably remain distinct, contractors will have considerably less reason from now on for choosing one type in favor of the other, because the cost type of contract will look very much like the conventional fixed-price redete minable or incentive contract.

Exceptions to the 80% restriction on payments under cost contracts were authorized in the case of those cost contracts negotiated without fee or

profit, with educational and non-profit institutions and for operation of gov-ernment-owned plants, Contracts nego-tiated with small business concerns or other firms which might suffer undue hardship from such arrangements were also excepted, provided there is a determination to that effect by the Secretary of the military service placing the contract.

The McElroy directive followed by a few days the start of an Air Force program to revise to the 80% payment level the cost-reimbursement contracts now held by 23 major USAF contractors (see chart). Objective of the ambitious Air Force renegotiation program is to persuade contractors to put up approximately \$250 million on their own in presently outstanding cost-reimbursement contracts.

As this is written, the Air Force is the only service which has decided to attempt a large-scale revision of its presently outstanding cost contracts. The McElroy directive provides that existing contracts should be conformed to the 80% payment restriction where possible by amendment, but it is not known whether the cost contracts issued by the Army and Navy can be amended or whether these services will follow the Air Force's lead.

The Air Force hopes to complete renegotiation of large outstanding cost contracts between now and the end of the fiscal year, a little more than seven months from now. If it succeeds, it will accumulate about \$250 million in temporary savings, thus alleviating the strain on the National Debt.

An interesting feature of the Air Force drive to renegotiate its cost contracts is the fact that it will probably affect all the companies working on the USAF program to develop intercontinental and intermediate-range ballistic missiles. Practically all of this work is

USAF will renegotiate its cost-type contracts with these companies in fiscal 1958

The Air Force has dropped plans to set ceilings on monthly payments to its 28 major contractors and has decided instead to renegotiate the cost-type contracts held by 23 of the big companies. Under the new arrangement, the contractors will be paid 80% of their costs as they accumulate instead of the usual 100%. The plan will have the effect of deferring about \$250 million in USAF payments when it goes into full effect.

C Spark Plug Division, General Motors Corp., Flint, Mich.

Aerojet-General Corp., Azusa, Calif.
Aircraft Engine Division, Ford Motor
Co., Chicago, Ill.
Allison Division, General Motors Corp., Indianapolis, Ind.

Indianapolis, Ind.
Boeing Airplane Co., Seattle, Wash.
Collins Radio Co., Cedar Rapids, Iowa.
Convair Division of General Dynamics
Corp., San Diego, Calif.
Curtiss-Wright Corp., Wood-Ridge, N. J.
Douglas Aircraft Co., Santa Monica,

Fairchild Engine & Airplane Corp., Hagerstown, Md.
Hughes Aircraft Division, Hughes Tool
Co., Culver City, Calif.
Military Products Division, International
Business Machines Corp., New York,

N. Y.
Lockheed Aircraft Corp., Burbank, Calif.
The Martin Co., Baltimore, Md.
McDonnell Aircraft Corp., St. Louis, Mo.
Western Electric Co., New York, N. Y.
General Electric Co., New York, N. Y.
North American Aviation, Inc., Los Angeles Calif geles, Calif.

Northrop Aircraft Inc., Hawthorne, Calif. United Aircraft Corp., East Hartford,

Radio Corp. of America, New York, N. Y.

Republic Aviation Corp., Farmingdale, L. I., N. Y. Sperry Gyroscope Co., Great Neck, L. I., N. Y.

(A total of 37 facilities are affected. Many of the above 23 contractors have supervision over several activities.)

presently performed under cost-type contracts.

One high Air Force official acknowledged that companies holding ballistic missile development contracts will be asked to go along with the 80% payment limitation, but declared this will not slow down work on the weapons.

"We aren't going to let the payment limitation produce a slowdown, he said. "It's just a financial arrangement and it won't slow down the pro-

gram one bit.

"I see no reason why the companies shouldn't be ready, willing and able to renegotiate their contractsparticularly if they are ICBM or IRBM contracts," the official continued. "I can't see anything but a gold mine

in a ballistic missile contract."

The official anticipated no difficulty confronting the major USAF contractors in borrowing additional funds. "The banks may want to put the squeeze on some of these fellows for reasons of their own, but they certainly won't lack for security in making their loans. If necessary, the companies can assign the proceeds of their cost-type contracts to the banks for security, and then draw against the banks for funds as they need them." Company officials were not as

optimistic as top Air Force officials, although they appeared somewhat less alarmed over future prospects than they have been in past weeks.

One representative of a large west coast aircraft company said it may be necessary for his organization to expand its line of credit with the banks from \$150 million to \$200 million as a result of the new McElroy directive and Air Force efforts to revise outstanding contracts.

He also expressed the hope that the banks might accept as collateral the partially-paid vouchers received from the government. Since these flatly guarantee payment of the whole charge upon completion of the contract, they would represent adequate security for extended credit, he suggested.

As to the over-all Air Force outlook on expenditures, one official said: We aren't out of the woods by a long shot, but at least we are beginning

to see some daylight."

Probably the most important factor in this improved picture is the decision of Defense Secretary McElroy to permit the Air Force to spend up to \$18.2 billion this fiscal year if necessary to maintain essential programs. This is an increase of \$300 million over the Air Force's previous spending target of \$17.9 billion. It repre-

sents the lion's share of the extra \$400 million which the White House has authorized the Defense Department to spend above its original \$19 billion ceiling for the first half of the fiscal year.

The \$38 billion figure originally set as the limit for military spendset as the limit for military spending this fiscal year is looking more and more like a target and less and less like a ceiling. While Defense Secretary McElroy is still hopeful that it can be met, it appears increasingly doubtful that this will be the case.

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The Air Force itself sees no way of "putting back" the extra \$300 million allocated by McElroy without rescheduling its programs. Even as things stand now, some reduction in production of spare equipment and ground support items may be necessary if the \$18.2 billion target is to be met.

In view of the current political uproar touched off by Soviet satellite successes, it is extremely doubtful that the Administration will reverse its softer stand of the past few weeks and order the old ceiling into effect.

Seven firms announce new employment cuts

Seven major aircraft and engine firms have announced additional layoffs following military decisions to stretch out or cancel programs.

McDonnell Aircraft Corp. will layoff 600 employes as a result of a slowdown of the F3H Demon fighter

program.

Beech Aircraft Corp. and Cessna Aircraft Co. will reduce employment by 200 and 125, respectively, as a re-sult of a cutback in the Lockheed T2V-1 jet trainer program. Beech and Cessna are Lockheed subcontractors.

Lockheed Aircraft Corp. expects reduce employment by 5,000 to 24,000 by the end of the year at the California Division.

Douglas Aircraft Co. has laid off 60 engineers because of lessening engineering work load on the DC-8 and missile programs.

Ford Motor Co.'s Aircraft Engine

Division is terminating "several hun-dred" employes because of cutbacks in

J57 orders.

Temco Aircraft is letting about 500 employes go at the Dallas-Grand Prairie and Garland facilities because of stretchouts in the F3H program, and phase-out of F-100 work.

Cessna deactivates four-engine 620 project

Cessna Aircraft Co. is deactivating its four-engine Model 620 project following a reexamination of the market potential and the financial investment involved.

Cessna's sales for the 1957 fiscal year reached \$70 million, compared with \$66 million last year. Increase was due to higher military volume. Earnings were estimated at \$5.05 a share.

Air Force gets new high-speed pitot tube



A MACH 3 PITOT TUBE, AF's first supersonic air pressure sensing element, has been developed for Air Research and Development Command by Waste King Corp., Los Angeles. New tube (left) is longer, narrower than present operational units, has knife-edge opening rather than blunt-type used previously. Wright Air Development Center engineers Paul E. Blatt, left, and Clifford J. Jolley report larger static chamber and lead-in lines have reduced "lag" considerably. Tube incorporates self-regulating electric heater, is vibration-resistant.

Defense memo supports airlines in fare hearing

by William V. Henzey

AS RUSSIAN scientific successes appeared to snap the tight cord of economy thinking in Washington this month, the Department of Defense minimized whatever economic arguments are used against an airline fare increase by stating: "Current war plans of the Department place major reliance on the United States air carrier industry."

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In a terse, two-page statement filed with the Civil Aeronautics Board in the General Passenger Fare Investigation, the Department—the Government's largest single user of airline passenger service—elevated to prominence the phrase "national defense," which hitherto has had a secondary role in the major CAB proceeding.

Said Maj. Gen. Reginald C. Harmon, judge advocate general of USAF: "The Defense Department recognizes as a matter of the greatest urgency the necessity for maintaining a strong, modern and economically sound air carrier industry to meet the requirements of national defense during peacetime and national emergencies."

Burden rests with CAB

The statement assumes even added significance when it is considered that the Department bolstered the position of an industry with which it spends increasing amounts each year and which totaled \$62,960,494 in the last fiscal year.

Thus, CAB, a model administrator of the Administration's pre-Sputnik economy policies, must now decide whether or not keeping the lid clamped on airline fares is a justifiable position when the issue of economic soundness is joined by such factors as national defense, national pride and, in fact, world supremacy.

It is encouraging to note that though the Government may spend untold billions to regain lost prestige, CAB can reflect the new policy without spending a dime of federal money. In fact, a favorable ruling on the airlines' request for a fare increase could save hugh federal expenditures which might otherwise be required to bail the industry out of financial difficulties, which already have set in.

For the airlines, the Defense statement was the first outward expression of support from the Government, although the financial world and the general public has been solidly behind the carriers. The General Services Administration has tempered its opposition to a price rise with public recognition of other objectives" which must be weighed by CAB in determining reasonable fares for the airline industry.

GSA clears the air

GSA, which foots the air travel

bill of executive branches of the Government other than the Defense Department, opposes public utility price rises as a matter of policy, but made it clear in the CAB case that it is not advocating opposition to an air fare rise if it means deterioration of the air industry.

It was in this changed and charged atmosphere, therefore, that the long-smouldering CAB fare case got into high gear this month. Breathing some life into the airlines' hopes was the CAB staff itself, which, in an early filed statement, recommended higher rates of return for the carriers. To replace

the 12% return as contrasted with 9% suggested by the CAB staff; emphasis on use of an operating ratio which has been shunned in the past by CAB; and reference to depreciation, residual and reserve accrual policies on which the industry and the CAB staff are far apart.

Delta Air Lines, Eastern Air Lines and Trans World Airlines join AA in seeking a 15% fare boost. Other carriers seeking specific increases line up this way: Braniff Airways, 12.5%; Captial Airlines, 20%; Northwest Airlines, 13%; United Air Lines, 17%; and Western Air Lines, 6% plus \$2 per ticket. Stating no position at this time

Capital petitions for Government subsidy

Capital Airlines has formally petitioned CAB for federal subsidy beginning with Nov. 6. The move, highlighting Capital's "critical financial condition," marks the first return to subsidy by a trunk carrier. Most lines have been off of subsidy since April 1, 1954, or before. Filing with "extreme reluctance," Capital asked that a subsidy rate of 30.73¢

Filing with "extreme reluctance," Capital asked that a subsidy rate of 30.73¢ per revenue plane-mile be established. This would produce subsidy of \$3,048,000 for the remainder of 1957 and about \$18,377,000 for 1958. If granted by CAB, it would convert an estimated 1957 loss

of \$2,575,000 into a profit of \$355,000, and a forecast 1958 loss of \$7,553,000 into a profit of \$5,196,000.

Capital said the additional revenues are equivalent to what would be realized if CAB would grant the carrier's request for a 20% fare hike now under consideration in the General Passenger Fare Investigation. However, it added, "in the absence of knowledge of what action the Board will take (in that case) . . Capital must here seek the (subsidy) relief to which Capital is entitled by its present financial situation."

the historic 8% return on investment, the staff urged CAB to recognize a 9% return for the "Big Four" carriers and a 10% return for the eight regional trunklines. Varying with the investment bases of the lines, each percentage point change in the rate of return involves between one and two million dollars.

As formal hearings were slated to get under way on Nov. 18, however, there were no indications the staff's suggestion could be parlayed into support for higher fares.

American wants 15% hike

Perhaps the best explanation of why this is so can be seen in American Airlines' statement of position as given in opening testimony of AA president C. R. Smith: "American Airlines needs a rate of return on its invested capital, after taxes, of approximately 12%; to provide an adequate margin of safety, its operating ratio, after taxes, should not exceed 93%. To this end our fares should be increased by 15%.

"We have come to this conclusion as a result of advice from outside consultants and our own studies and experience. This conclusion assumes a continuation of American's present rates of depreciation and residual values for the existing fleet, and continuation of its present practice of accruing reserves for deferred taxes."

Significant in Smith's statement is

are Continental Air Lines, National Airlines, and Northeast Airlines.

Atmosphere changes

This, therefore, was the stage-setting as the most important industry-wide case in U.S. commercial aviation history moved to the critical hearing stage. The atmosphere has changed sharply since the abortive attempt of seven carriers to get an interim 6% increase this past summer. In that case, Congressional overtones were unfavorable to the carriers.

In the present case, with world affairs dictating a more realistic appraisal of the industry's position, the situation appears more favorable for the airlines.

But throughout this epoch of stagesettings, changed atmosphere, etc. runs the basic, unalterable theme that the U.S, airline industry needs money both to cope with today's problems and to finance tomorrow's jets. Yet, only a fraction of the carriers' problems have been focused upon.

To date, the jet age has been weighed largely in terms of the specific orders placed for jet aircraft. Though imposing in their own right, such orders, it is now clear, are only the start of a more extensive reequipment program, the next phase of which can't begin without drastic changes in Government policies.

Emphasizing this broad problem

particularly was American, whose studies show that 15 long-range jets and 25 intermediate-range jets will be needed by 1961, over and above the 30 Boeing 707s and 35 Lockheed Electra turboprops now on order. To help finance its original jet order, American borrowed \$135 million from major insurance companies. The added jets will create a need for an additional \$200 million between now and 1961.

Interest on jets runs high

To give an idea of how sobering such obligations must be on airline managements, one only has to consider that the interest alone on AA's initial \$135 million loan will be \$6,362,000 per year by 1960, or more than enough to buy three brand new Douglas DC-7s.

From another standpoint, American, which has enjoyed a wholesome debt-to-capital ratio of 20%, will find its ratio over 60% as a result of the initial jet loan. "This," Smith testified, "would be the highest debt ratio American Airlines has had since 1938."

Just how AA intends to go about financing the additional 40 jet aircraft will be detailed as the CAB hearings unfold. But, as a general principle, the line estimates it will need annual earnings of approximately \$25 million a year, after interest and taxes, with the prospect of appropriate further increase as business grows. Even the 15% fare increase would fall somewhat short of producing such earnings. Smith said.

producing such earnings, Smith said.

So emphatic are the airlines' pleas and so relevant their reequipment programs, that there is a remote possibility of an early CAB ruling on the fare hike requests as distinguished from the many policy matters which could take another year to explore adequately. The hearings alone, as things now stand, could run well into January and pos-

Airlines look beyond present jets

American Airlines' statement that it will need 40 additional jets beyond the 65 now on order is not an isolated problem. Here is how other top industry leaders will testify as CAB hearings in the General Passenger Fare Investigation

progress:

United Air Lines—W. A. Patterson, president: "Our 1955 financing program did not provide for all of United's expansion needs in the 1956-61 period. If we are to meet the demands of expanded air traffic volume . . . it is necessary that United acquire a fleet of jet aircraft designed to do the job in the medium-range market, in addition to an expanded order for long-haul jet aircraft. . . . Market projects indicate a need for a substantial number of such aircraft of whatever type is finally selected."

Eastern Air Lines—Thomas F. Armstrong, president: "Eastern's fleet of Martin 404s will be retired within a relatively short time. . . Our present loan agreement with Equitable Life Assurance Society did not contemplate, and cannot provide, sufficient funds for replacement of the Martin fleet and the Convair fleet. It will not even meet present committments at today's fare levels."

Delta Air Lines—Todd G. Cole, vicepresident: ". . completion of financing for existing commitments cannot be viewed as our only financing project of the next decade, but instead merely a one more step (albeit a large one) in the continuing program of providing capacity to discharge our service obligations. . . Even with jets on order, the seat-mile capabilities of Delta's fleet in 1962 will be deficient by 235 million seat-miles."

Braniff Airways—Charles E. Beard, president: "Will need a bare minimum of three intermediate-range aircraft in addition to present orders by 1962, and an undetermined number of additional aircraft if a suitable short-haul prop is or straight jet is developed. . . Our 1962 projection shows that approximately one-third of our capacity will still be provided with piston-powered planes."

Northwest Airlines—William J. Eiden, treasurer: "Initial requirement is

Northwest Airlines—William J. Eiden, treasurer: "Initial requirement is for 11 jets, which with related spare part will cost approximately \$65 million." Additional facilities will up cost to \$722 million "which is totally beyond the scope of our present financing problems. By July 31, 1958, our debt will be in excess of 180% of our net worth."

Capital Airlines—A. H. Norling, economic planning director: "Our projected program would require a total

Capital Airlines—A. H. Norling, economic planning director: "Our projected program would require a total of three jet aircraft by the end of 1959, 12 as of the end of 1960, 15 at the end of 1961 and 18 as of the end of 1962."

sibly February. If such a schedule is maintained, the first jets may be delivered before a final decision is reached.

Convair to offer J57-powered 880

Convair has prepared specifications for an alternate model of its 880 jet airliner powered by a new lighterweight version of Pratt & Whitney's JT3 (J57) engine. Standard powerplant for the Convair 880 is General Electric's CJ-805 (J79) engine.

tric's CJ-805 (J79) engine.

The new P&W engine, incorporating the use of titanium, is reported to be 750 pounds lighter than the standard JT3, and this in a Convair 880 installation would reduce the weight advantage of the GE engines from approximately 8,000 to 5,000 pounds per airplane. P&W also is reported to have accomplished a 2% improvement in specifics with the lighter engine.

San Diego reports indicate that the two power plants come out pretty much the same for medium-range operation in the Convair 880, but the GE's weight differential makes it more suitable for longer-range operations in this

re

particular aircraft.

The new P&W engine also accomplishes improvements in the performance of the Boeing 717, one phase being in a better thrust curve for takeoff and reducing the need for water augmentation for certain field lengths.

Gen. Al Boyd retires

Maj. Gen. Albert C. Boyd, deputy commander for weapon systems of the Air Research & Development Command, has retired after 30 years in the service. He recently was awarded the Distinguished Service Medal for outstanding contributions in the advancement of aircraft testing methods during his assignment with AMC.

In addition to the DSM, General Boyd has received the Legion of Meril and Distinguished Flying Cross. He has flown every aircraft in the current

USAF inventory.

Sonic boom demonstration is inconclusive; no damage to TV sets, radios, dishes, windows

Witnesses to a recent joint Air Force-Navy-Marine sonic boom demonstration near Mojave, Calif., were left with the impression that "booms" are still fairly unpredictable things.

Many spectators expressed the opinion that although the blasts were apparently carefully aimed at the test area and were very definitely audible, they did not experience the same effect in their own homes or other buildings. (See AMERICAN AVIATION, April 8, p. 31.)

On the other hand, an equal group

On the other hand, an equal group of those in attendance said the demonstration "booms" were the sharpest

they had ever felt.

Staged for the benefit of CBS television cameras in filming background for a special program on the network's local outlet, the controversial "booms" were created at various altitudes by four fighter aircraft.

Beginning with a run at 40,000 feet, an F-100F, F-102, F8U and F4D each exceeded Mach 1, with the resulting shock wave reaching the ground a few seconds later. The same process was repeated at 30,000, 20,000 and approximately 10,000 feet.

Although the blasts increased in intensity at the lower altitudes, no damage was done to the special structures, TV set, radio, dishes and windows set up for the test.

The aircraft also made a low-level pass, cutting in their afterburners to demonstrate the difference in that sound from the sound of a sonic wave.

The event was informative if not conclusive, and the services did a good job, as one AF officer put it, of "laying their cards on the table." If a conclusion is to be drawn, it would be that all parties involved need more information on the subject.

NOV



Before Attachment

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TION

Seal retracts into shell, but remains in contact with structure.



Installation forces bearing surface of sealed washer to contact structure, providing positive single point sealing.

Nutt-Shel has designed many new products to solve complex problems, but none has received greater acceptance than this self sealing dome nut. For integral fuel tanks, and other applications where positive sealing is required, this design has been proving its reliability for five years.

FEATURES

Conforms to all applicable government specifications. Floats .025" in all directions. Two series: standard and light weight. Narrower envelopes in light weight series, same thread sizes. Available: silicone sealing ring; stainless steel shells.

Pick Part Numbers From This Table



Thread Size	Fuel Sealing	High Temp. Silicone	Corros. Resist. Shell & Nut	Miniatures
6-32	4630H-62	4630HA-62	4730H-62	M14630-62
8-32	4630H-82	4630HA-82	4730H-82	M14630-82
10-32	14633H-02	14633HA-02	4730H-02	M14630-02
1/4-28	14630H-048	14630HA-048	4730H-048	
5/16-24	4630H-054	4630HA-054	4730H-054	
3/8-24	4630H-064	4630HA-064	4730H-064	
7/16-20	4630H-070	4630HA-070	4730H-070	
		DEDDE CENTE A TENE	g	

REPRESENTATIVES

EAST — RUSSELL ASSOCIATES, Inc., Brightwaters, L.I., N.Y.; Haddonfield, New Jersey; Buffalo 26, N.Y.; Baltimore 4, Md.; Cincinnati 2, Ohio; Detroit 35, Mich.; CANADA — ANTHONY FOSTER & SONS, Ltd., Toronto, Ontario; MIDWEST — RUSSELL ASSOCIATES, Inc., Chicago 32, Ill.; C. V. QUALLY Co., St. Louis 5, Mo.; WICHITA AIRCRAFT SUPPLY CO., Inc., Wichita, Kansas; SOUTHWEST — CASHIN-TIPTON & ASSOC., San Diego 10, Calif.; McDONALD INDUSTRIAL SALES, Inc., Phoenix, Arizona; SOUTH — The DYESS Co., Ft. Worth, Texas; RUSSELL ASSOCIATES, Inc., Atlanta, Ga.; WEST — O. J. HARPER Co., Renton, Wash.; SELCAL SALES & ENGR. Co., Berkeley 2, Calif.



another product of Air Cruisers research



Trouble! An air transport has to be cleared of its passengers in seconds! No time for more trouble with equipment.

The Air Cruisers escape slide shown here is designed to get passengers out-but quickwith all the dependability of the sunrise.

Dependability has long been an Air Cruisers specialty. It begins in the design stage, where Air Cruisers brings to bear the most advanced, proved principles of good design. And it continues through every stage of manufacture. For only with precision engineering and fine workmanship can dependability be achieved.

These are the pains that Air Cruisers takes in making all of its products...which also include lightweight industrial plastics and radiation shielding. That's why you can have complete confidence in Air Cruisers' equipment.



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New Defense chief is bold, dynamic and decisive

Neil McElroy is a big man who gets things done quickly, relies heavily on expert advice in making decisions

by Douglass M. Allen

ON OCT. 9 when Neil Hosler McElroy succeeded Charles Erwin Wilson as Secretary of Defense, the planets Libra and Sputniks were in ascendancy.

The horoscope of the new Secretary, born under the sign of Scorpio, reads as follows:

"Associates and higher-up are at dagger's point. Don't get involved or you may become the whipping boy. Keep busy at own tasks with one ear cocked. Later you can give your own opinions, advise wisely and bring peace and prosperity."

Secretary McElroy apparently ignored his horoscope that busy day. Before the ink was dry on his commission of office, he called a press conference and promised to expedite the United States' missiles and satellite programs by "ironing out bottlenecks."

This was a startling pronouncement, because while associates of lower rank had been sharply critical in private of such restrictions as a prohibition on overtime payments in missile development, neither higher-up nor predecessor Wilson, then just disappearing over the horizon in a plane, ever had acknowledged the existence of bottlenecks.

Sudden White House exit

After three subsequent days of top-level conferences at the White House on the subject of Russia's sobering gains in rocketry and space exploration, McElroy emerged with his fist more nearly cocked than his ear.

"I think that will be all," he said abruptly to White House correspondents crowding around him, as he shouldered his six-foot, four-inch, 210pound frame through their circle.

There were those who believed he was angry, not at the press, but at the President, who seemed at that point maddeningly reluctant to accept the significance of Sputnik in world propaganda and rocket capability.

"Not at all," says Oliver M. Gale, a public relations expert imported by McElroy from the Procter & Gamble Co., whose \$285,000-a-year presidency he had just resigned. "He wasn't angry at anvone. He's just a bundle of nervous energy and, being the size he is, when he wants to go, he goes!"

Go he did. Within another two weeks the heavens were bright with American missiles that thundered through the skies instead of staggering drunkenly into the ocean. And the press



Neil McElroy in action.

was let in on the fact that we HAVE advanced weapons that work.

Previously newsmen, barred from rocket-launching sites or any substantive information, were able to report little but abortions—the splashes they could see from a distance. The successful missiles sometimes sailed away while heads were turned, and then were treated by the Defense Department like remittance men, not to be mentioned in polite society. You might have thought that Charlie Wilson was spawning an Edsel, the way he kept things under wraps.

Not so his successor. Mr. McElroy learned long since, on his climb to the P&G summit, not to hold a good product down. If it floats, for heaven's sake let it, is his dictum. The rocket's red glare, he is convinced, is more effective than that of a Pentagon official.

When the Senate Armed Services Committee was considering McElroy's appointment for confirmation, only one really sticky question was asked. The Secretary-designate had won approval of his proposal to retain his 12,000 shares of P&G stock, worth about \$600,000, provided he sell his \$40,000 worth of General Electric and \$15,000 worth of Chrysler and resign his directorships of those two prime defense contractors.

But Senator Henry M. Jackson, Washington Democrat, wanted to know how long it would take McElroy, with no technical background in the modern weapons' field, to qualify for making the decisions required of him as Defense Secretary.

Secretary Wilson answered for the nominee, who had modestly declined, "Not very long," he snorted. "He's a very fine, competent and experienced

man . . . a good captain of the team."

He might have added that McElroy, personally, is hardly more qualified to make soap than intercontinental
ballistic missiles, but Proctor & Gamble,
with 30,000 employes in 15 countries,
flourished under his stewardship. McElroy is no engineer or scientist. He is
an administrator and sales promoter
with a keen sense of what the public
wants, and what he wants, and how to
get it from those who ARE engineers
and scientists.

To gain an understanding of Neil McElroy, you must know something of the company that he served for 32 of his 53 years—his 53rd birthday was Oct. 30.

Founded as a partnership in a small building in downtown Cincinnati 140 years ago, it has grown to rival UniLever as the biggest producer of soaps and synthetic cleansers in the world, and the hands-down leader in the United States. Its management traditionally has been liberal in compensation and incentive, but strict in its demands on employes. It pioneered guaranteed employment in 1923 and has a profit-sharing plan that permits even janitors of long service to retire with substantial estates.

Wine, wardrobe and walking

But executives seen drinking cocktails at luncheon find themselves in trouble; any sharp deviation from the style of normal business dress sounds a call to the carpet, and the use of an elevator to descend less than three floors is discouraged—even in the spanking-new, block-long headquarters building in Cincinnati.

As a result of its enlightened labor relations policies, P&G has automatically discouraged most international unions from attempting to organize its multiplicity of shops. At one point or another the company deals with almost every union there is, but its major employe associations remain independent. The AFL-CIO simply has nothing to offer them, and recognizes the fact.

It was in this atmosphere of liberalism in big things and strict discipline in small ones that the new Defense Secretary won his industrial spurs. He joined P&G as a clerk after graduating from Harvard in the sum-

mer of 1925. His intention was simply to make some money and help pay tuition to Harvard Business School the following fall. But his progress in the company was so rapid, he never left.

The son of two school teachers, he had gone through Harvard on scholarships, which he augmented by playing the piccolo, piano and poker. He also played basketball, which profited him nothing material in the aseptic Ivy League, but helped him to become president of Sigma Alpha Epsilon.

At Procter & Gamble he rose to manager of the promotion department in four years. Eleven years later, at a time when P&G had become one of the world's biggest advertisers, he took charge of advertising as well as promotion. In 1943 he rose to director and vice president in charge of advertising; in 1946, to vice president and general manager and, in 1949, to president.

No question about president

"There was never any question in my mind who would succeed me as president," says R. R. Deupree, chairman of the board. "Mac's drive and ability simply made him a marked man. One of his big assets is that he will work with a group of men, but he'll take the responsibility for the decision. He picks strong advisers and uses their knowledge to the best advantage, recognizing his own limitations in technical and other fields that he can't possibly know."

Once he reached the higher echelons of management, McElroy devoted much of his time to civic projects on both local and national levels. In Cincinnati he headed the Red Cross and Community Chest drives and was a prime force in the Citizens Development Committee, which pushes plans for expressways, urban renewal and similar improvements designed to forestall urban decay.

Nationally, he served as chairman of the White House Conference on Education in 1955. In that exacting capacity, he enlisted both staunch admirers and severe critics by ruling that no one might speak from the floor.

His purpose was to prevent a fili-buster by an organized Federal-aid-toeducation lobby, not because he disagreed with those eager to speakwhich he did-but because they threatened to bring chaos to the tightlyscheduled conference.

"If I had let them talk," he explained at the time, "we'd have been

here for weeks."

In national politics, McElroy is unswervingly Republican, but he admits to certain unspecified deviations

at lower voting levels.

Personally, the new defense boss is a handsome, agreeable man, who parts his wavy gray hair just to left of center; wears conservative Brooksstyle clothes; smiles easily and laughs frequently and with gusto at leisure, but is largely dedicated to business during the working day, which normally

begins at 8 a.m. and ends when his conscience lets it.

He likes memoranda reaching his desk to be held to a single page, if possible, with the conclusion stated before the supporting arguments; so that if the conclusion strikes him immediately as correct, he needn't wade through a polemic. He is a stickler for facts and impatient to the point of intolerance with anyone who tries to duck them, or obscure them or intentionally misread them.

His temper, when fired, works like one of those refrigerators activated by flame. The victim of his ire is not cre-

mated, but deep frozen.

Because of his experience-inspired conviction that the turnover of trained personnel is wasteful and that people should be amply compensated for their contributions to any task, Secretary McElroy can be expected to give sympathetic study to the Cordiner report, which proposes an armed forces pay scale based on skills rather than longevity.

In dealing with private enterprise, he is sure to be sympathetic with legitimate claims and complaints, and ruthless if he senses that some one is trying sharp practices on the govern-ment. He has recently issued an order squelching the suggestion of certain subordinates that they balance departmental budgets temporarily by deferring payments to contractors. But he is reviewing the whole theory of progress payments, with an eye to forcing on the contractor a greater share of development risks.

Champion of competition

Secretary McElroy is a champion of competition. It was he who introduced the concept of rivalry between P&G brands of similar nature, like Ivory and Camay, and Duz and Tide. But he is aware that interservice rivalries may exceed the limits of healthy competition in such fields as missile development.

"Once it is clear, as a result of competitive experiment, what our direction should be, then no further competition will be tolerated," he told his

first news conference.

Unlike the man he succeeded, Mc-Elroy is also a confirmed believer in basic scientific research under govern-

ment sponsorship.

"You could count on my support of pretty speculative thinking on the part of high-grade scientists," he told newsmen. "You would not find me on he told the side of cutting a research budget. I will be sympathetic-more than that to emphasis on a research program."

That is good news for scientists, because McElroy has a business reputation of fiscal generosity for any program he believes worth supporting.

"Where Mr. Deupree would have thought in terms of one million dollars, Mac thinks in terms of two, said a former close associate at P&G.

Incidentally, it was McElroy, as vice president, who persuaded Deupree

that the company needed a fleet of three souped-up DC-3s and a private hangar and terminal in Cincinnati,

As to being infantry-minded, carrier-minded, bomber-minded or missile. minded, Secretary McElroy appears to be generally open-minded, to the extent that any rational man can be while the Sputniks soar around the globe. His preoccupation with missiles was obvious when shortly before taking office, he toured defense installations and plants on a schedule as rigorous as a Nixon campaign trip. Rocket and missile centers dominated the itinerary

No golfer, McElroy

Of personal predilections there are none. The Secretary's only military service has been in a horse cavalry unit of the Ohio National Guard. Every soap maker knows what has happened to the horse cavalry.

Unless he takes up golf belatedly, Secretary McElroy isn't going to be able to join his boss on the links of Burning Tree or Gettysburg. He has

never played.

As soon as the initial pressure eases a little, though, he'd like to find a tennis doubles game. And he will be able to sit in with the President at bridge, which he plays almost as expertly and aggressively as poker.

Secretary McElroy and his wife, the former Camilia Fry of Terrace Park, outside Cincinnati, are living in an apartment in Washington, near St. Albans School, where their youngest child, Malcolm Neil, 14, boards. They have kept their 15-room gray stucco house in Cincinnati's Hyde Park suburb, where Mr. McElroy developed his major household eccentricity—eating chocolate cake for breakfast.

The two McElroy daughters live in Cambridge, Mass., where Mrs. David Dimling keeps house for her husband, a student in Harvard School of Business Administration—the one the Secretary never quite reached. Her younger sister, Nancy, also is a Harvard graduate

student.

Where next for McElroy? There are friends in Cincinnati who thinks he believes the White House is a fine place to visit, but even a better place to live.

Asked recently how he liked his

new job, Mrs. McElroy replied:
"Oh, he's just taking it in his stride
as he does everything. There's no job too big for Neil."

About the author

Douglass M. Allen, Washington correspondent for the Cincinnati Times-Star, is one of a few, if not the only journalist on the national scene who could present the new Defense Secretary from first-hand knowledge of his background. Mr. Allen has known Neil McElroy personally for more than 10 years. He began as a journalist in Proctor & Gamble's home grounds in City in the control of the contr cinnati in 1937, was feature editor of the Cincinnati Times-Star and editor of the Kentucky Times-Star before transfer to the Washington scene in December

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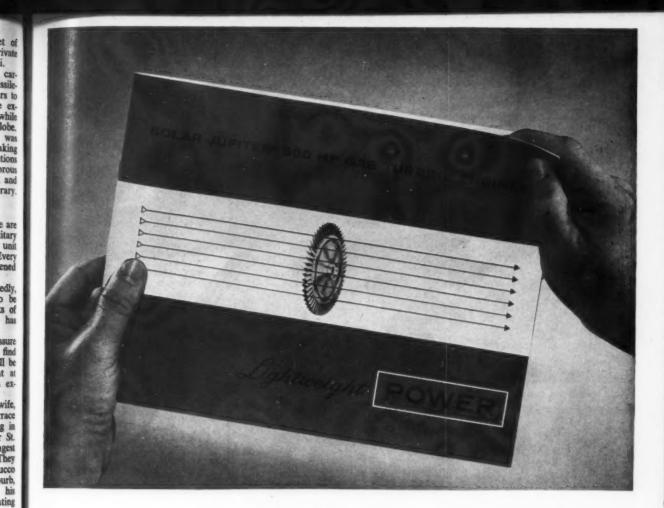
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solar's 500 HP JUPITER gas turbine offers a radical new power concept for forward-looking businesses. One of the simplest of all heat engines, it provides reliable power for a wide range of military and commercial applications—including boat propulsion, mechanical drive, power generation and others. New users praise its high power-to-weight ratio, its instant starting even under severe temperature extremes, its easy portability and low maintenance requirements.

Solar has prepared a colorful 24-page booklet giving full details about the Jupiter. It contains all of the information necessary to acquaint you with the many advantages of this exciting new engine—and it's yours for the asking. Learn how this power plant of the future can go to work for you—today! Solar Aircraft Company, San Diego 12, California. Designers, developers and manufacturers of gas turbines, expansion joints and aircraft engine, airframe and missile components.



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400 MPH...THE NEW JET-PROP

VISCOUNT 810.840

Factor: New Viscount will have an initial cruising speed of 365 mph with Rolls-Royce jet-props. By 1960, more powerful Rolls-Royce engines will be available—increasing the mph to 400.

Orester Capacity: Designed for higher operating weights, new Viscount is 9'3" longer. Result: increased seating capacity. First class: 52. Coach: up to 70.

Lower Costs: Same operating cost-per-mile as present Viscount 700 series but with lower-cost-per-seat-mile due to greater capacity.

These Airlines Have Ordered Viscount 810/40's:

Continental Air Lines, South African Airways, Lufthansa, Pakistan Int'l. Air Lines, Compania Cubana de Aviacion, V.A.S.P. (Brazil), Eagle Aviation Ltd. New Flexibility: New Viscount can carry full payload over ranges of 200 to 1200 miles (1400 miles with "slipper" tanks.)

Proved Performance: The Viscount is the most proved jet-prop. Viscounts will have chalked up over 1,000,000 hours by the time the first 810's go into regular service. There's no substitute for experience!

Orders from over 30 of the world's leading airlines prove that "wherever the Viscount flies... traffic figures rise."

Jet-prop VICKERS VISGOUNT

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Hiller's portable Rotorcycle cruises at 52 mph

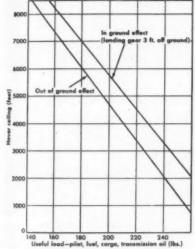
Hiller Helicopters' portable oneman helicopter, designed to give a vertical dimension to "ground" warfare, shows a 52-mph sea-level cruise speed and a 27-mile cruise range. Called the XROE-1 Rotorcycle, the craft was first flight-tested about a year ago. Until recently, the Navy held the engineering part of the project classified.

neering part of the project classified.

The Rotorcycle was designed and constructed for the Marine Corps under contract to the Navy. Lately, the Army has shown interest in the project.

The XROE-1 ranks high in portability. By removing quick-disconnect pins, the pilot can quickly disassemble and fold the vehicle into a package 14 ft. long by 27 in. in diameter.

Powered by a 40-hp two-cycle four-cylinder Nelson engine, the Rotor-



HOVER CEILING versus useful load for Hiller Rotorcycle.

cycle is intended primarily for reconnaissance, training and courier-type missions. Craft gross weight is 526 lbs. A conventional helicopter configuration is used with a single two-bladed rotor.

An aerodynamic servorotor, consisting of two small airfoil shapes located slightly below the plane of the main rotor, controls the cyclic pitch of the main blades, which tilt the rotor plane as required. The cyclic pitch of the servorotor is controlled through a swashplate, which is connected to an overhung control stick.

Judging from flight test results, Hiller engineers said that the craft is extremely stable, "surpassing even our expectations."



XROE-1 ROTORCYCLE is shown hovering during recent test flights.



CRAFT can be quickly disassembled and compactly packaged for portability.

Performance and characteristics of XROE-1 Rotorcycle

Nelson model H-59, two-cycle, four-cylinder, horizontally-oppo-ed, air-cooled; engine rating, 40 bhp/4000 rpm. Fuel consumption 4.5 gph at approximately 75% power.

lbs, pack or misc. equipment 526 lbs.

Fuel consumption 4.5 gph at approximately 75% p Transmission Engine: Main rotor gear ratio = 7.39:1

Engine: Tail rotor gear ratio = 1.23:1

Fuel System

One 2.5-gal. capacity tank, gravity feed. Fuel quantity—2.4 gals. mixture (8 parts 80-87 octane fuel to 1 part SAE 30 oil).

Dimensions

General (when assembled)

Maximum	length							*	*	8.				16.5	ft.
Maximum															
Fuselage	length													12.0	ft.
Height															
Tread		 												8.9	ft.

Characteristics

Rotor diameter	18.5 ft.
No. blades	
Blade twist	-8°
Blade airfoil section (constant)	NACA 0015
Blade chord (constant)	
Control rotor diameter	5.2 ft.
Tail rotor diameter	3.0 ft.
No. tail rotor blades	2
Tail rotor torque arm (main rotor CL to	
tail rotor huh)	7.0 ft

16 lbs. fuel 180 lbs. pilot

Lear unveils new flight director, attitude indicator

Lear, Inc. has developed an aircraft flight instrument that combines the functions of a flight director and attitude indicator. It is similar in display to the Lear MARS (Master Attitude Reference System) but has two cross pointers superimposed in front of the movable attitude-indicating sphere.

The instrument permits the pilot to control the aircraft in attitude, intercept a selected radio beam smoothly and fly a course in relation to the signal. When the horizon line of the two-tone background sphere is aligned with the airplane reference, the aircraft is in level flight. By reference to the cross pointers, the pilot can maneuver in reference to localizer, glide path, omnirange or "command" radio signals.

Offers two versions

Lear offers two versions of the instrument. One uses a fixed airplane in the center with two moving cross pointers. The other uses an airplane which may be fixed or may be switched to move, providing an exaggerated pitch indication.

In both versions, signals from the steering computer in the system are applied to the steering pointer to provide asymptotic intercept of radio beams such as localizer and omnirange.





LEAR flight director-attitude indicator with fixed miniature airplane reference (left) and movable airplane.

In the pure "attitude" mode, the steering pointer is deflected out of sight to avoid clutter. At the bottom, an inclinometer tube and meter-actuated pointer provide slip indication and turn rate information.

With internal amplifier, the indicator package measures 74% x 54% x 55, weighs 7 lbs. With remote amplifier, indicator measures 7" x 14% x 5",

weighs 6½ lbs. The separate amplifier package, if required, weighs 1½ lbs., measures 4" x 335" x 335".

Beech D-18S to get French turboprop

Beech Aircraft Corp. will install Turbomeca Bastan turboprops in a Beech D-18S. Installation will be made by SFERMA, a subsidiary of Sud Aviation, and the aircraft is expected to fly by summer.

Beech also is reported interested in a quantity of Morane Saulnier jet utility transports. At least one of the jets is scheduled to be delivered to a commercial user. Beech is expected to buy 22, two of which already have been contracted.

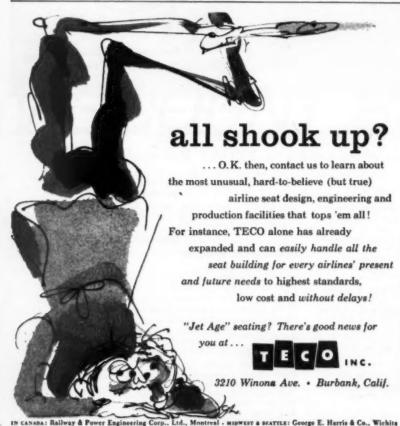
Beech is negotiating with the French firm for rights to the MS-765, a six-place version of the jet for entry in the Air Force jet utility trainer competition.

GE gives new specs on T58 performance

General Electric Co. reports its T58 turboshaft engine for helicopters produced 1,065 hp. during the official 150-hour model test for the Navy, compared with the guaranteed power of 1,024 hp.

During a recent press conference at which T58 details were declassified, GE said the engine demonstrated a specific fuel consumption of 0.655 against a guaranteed level of 0.66 lbs./hp./hr.

The company said that the engine had a pressure ratio of better than 8 to 1, a compressor airflow of 12.4 lbs. air/sec., a turbine inlet temperature of 1,600°F and total weight, including reduction gear, of 325 lbs.



gineering Corp., Ltd., Montreal - MISWEST & SEATTLE: George E. Harris & Co., Wichita Circle No. 132 on Reader Service Card.

NOV

High pressure relief valve for -320°F helium service



Helium high pressure relief valve undergoing part of functional test procedure

An important feature of this assembly is its zero external leakage - while the maximum internal leakage is as low as 100 cc per minute at slightly below reseat pressure. The unit is applicable to all types of helium and other pneumatic systems.

Here is another outstanding contribution by Whittaker's engineers in the field of missiles!

Specifications demanded a unit with a high degree of reliability and consistency . . . resistance to vibration and acceleration . . . and very short range between crack and reseat pressures!

This lightweight valve - with all its basic components made entirely of stainless steel - meets all these critical requirements of a missile application. In design and production particular emphasis was given to consistency, so that there is no variation in performance between one valve and another.

The tube size of this unit can be varied to suit customer requirements. Furthermore, the unit size does not increase in proportion to tube size.

This is only one of the many kinds of missile problems that Whittaker has solved. This wide experience is available to you now.

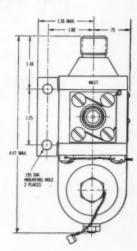
PERFORMANCE

SERVICE. Helium gas FLOW. 6 pounds per min. at low temperature

TEMPERATURE. Ambient, -320°F to +300°F Fluid, -320°F to +300°F

PRESSURE. 3250 psi **Operating Pressure**

WEIGHT. 1.5 lbs. TUBE SIZE. %"



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Please send me further information on the Whittaker Helium Pressure Relief Valve, P/N 141955. Check one: ☐ Reference information ☐ Project information

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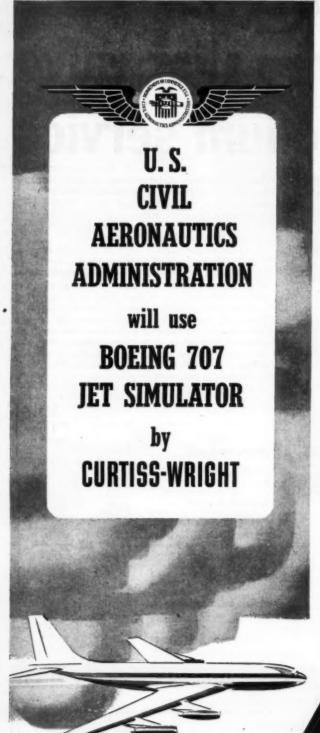
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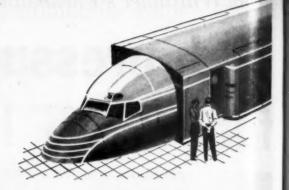
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...to familiarize CAA personnel with jet transport operation

Playing a leading role in the transition to the jet era, the Civil Aeronautics Administration has selected an electronic jet Simulator to be designed and built by the Electronics Division of Curtiss-Wright Corporation. Among its many missions will be the training and familiarization of CAA air carrier inspection personnel in jet transport operations, including all phases of airline flight crew training . . . and the study of approach and holding procedures for improved air traffic control in the jet era.

At the same time, the CAA will take advantage of another dimension in the realism of flight reproduction — Curtiss-Wright Dehmel Visual Aids Simulation Equipment. This new Curtiss-Wright equipment consists of scale models of specific airports, and a mobile television camera which responds to the pilot's control — enabling him to rehearse landings and takeoffs under VFR (Visual Flight Rules) conditions.

The airport environment, buildings and runways are realistically viewed by the pilot, on a large screen, in their true relationship to his altitude, position and approach.

Simulators by Curtiss-Wright have been produced for nearly every type of advanced civil and military aircraft. They have a long background of proven service, including extensive use by the CAA itself. Every fully electronic Simulator used by U. S. airlines today is a product of Curtiss-Wright.



CURTISS-WRIGHT DEHMEL training equipment licensed under basic patents of R. C. DEHMEL AND CURTISS-WRIGHT. Canadian Licensee: Canadian Aviation Electronics Ltd., Montreal—British Licensee: Redifon Ltd., London—French Licensee: Société d'Electronique et d'Automatisme, Paris

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New silicones crash hydraulic-fluid thermal barrier

Higher thrust-weight-ratio engines, temperature-resistant greases and lubricants, thermally stable fluids, promised by GE-developed material

by William Beller

LUBRICATION engineers have been pressuring research organizations for lubricants that can withstand extreme environments characteristic of aircraft now on the drawing boards. In only a few cases has this pressure been able to do useful work.

It is not too strange that many companies, ones able to make significant contributions to high-temperature lubrication technology, are loathe to do so because the dollar volume of the market is relatively small. This situation is unfortunate because the pivot points for powerplant design and also secondary power systems are engine oils and hydraulic fluids.

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Therefore, when a new fluid comes to market and promises lubricity and thermal stability in the higher temperature ranges, it is an event. Such an event took place recently when Dr. Charles E. Reed, general manager of the Silicone Products Department of General Electric. Waterford, New York, revealed that his organization had developed a class of silicone fluids able to increase engine operating temperatures 150°F.

As an example, with the new silicones—called GE fluids 81717 and 81644—500°F engine oil temperature and 600° to 700° hot spot temperatures can be lived with. These tem-

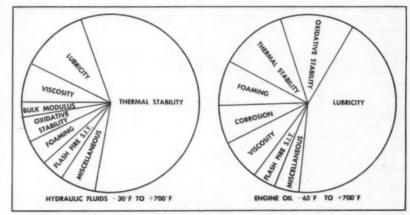


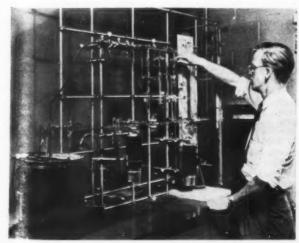
Chart shows relative influence physical properties play in choice of lubricating fluid.

peratures exceed by a comfortable margin the design temperatures in a standard engine—350° to 400°F oil temperatures and 450° to 500°F at hot spots

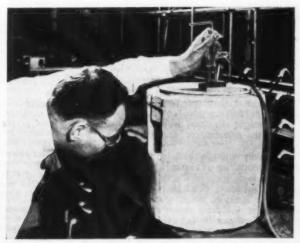
In terms of engine performance, raising the engine's operating temperature leads to greater thermal efficiency and thrust, and hence to an increased thrust-weight ratio.

These new fluids have much wider fields of application than just in powerplants. Consider the following: lubricants for instruments and servomechanisms; constituents for greases for ball-bearing equipment; and, of course, as the power transmission medium in hydraulic systems.

Trademarked "Versilube" fluids, the GE silicones were produced under a development contract with Wright Air Development Center. Primarily intended for hydraulic systems, fluid 81717 can withstand prolonged use



VISCOSITY-TEMPERATURE relationships of silicones at elevated temperatures are studied in a specially devised GE apparatus capable of reaching temperatures up to 1,000°F. Chamist Edgar D. Brown, Jr. is inspecting test sample.



NORMAN G. HOLDSTOCK, research chemist testing hightemperature fluids, prepares to check a silicone fluid on testing system developed to investigate thermal stability characteristics. Studies can be made up to 1,000°F.

from -65°F to 575°F. Under certain conditions, such as short-term missile operation, the service temperature can be extended to 700°F.

Silicon fluid resists oxidation

The other new silicone fluid, 81644, was designed for use where exposure to air cannot be controlled, such as in engine lubricating systems. The fluid remains stable under oxygem exposure up to 510°F, about 70°F higher than was possible with previous silicones and most other lubricants.

Versilube 81644 is said to be a somewhat better lubricant than standard silicone fluids. Other type fluids such as polyglycols, diesters and orthosilicates break down at temperatures ranging from 400° to 450°F. At these temperatures they varnish, coke and form hard deposits.

Both 81717 and 81644 are companions to a third GE chlorophenyl fluid, Versilube F-50. This latter product was one of the early silicone fluids designed to be a lubricant. Having the best thermal stability of any of the three Versilube fluids, F-50 is the only one that has no additives.

Prior to F-50, silicone fluids were respected for their remarkable viscosity stability at both high and low temperatures, but were ignored because of their relatively poor ability to lubricate. This condition is still true, relative to other available lubricants, for the low and moderate temperature ranges.

The remarkable properties of silicones stem from their being semiorganic materials. The building block is a silicon-oxygen-silicon chain, which has high thermal stability. Fluidity is gained by attaching organic radicals to the chain, carbon-hydrogen (CH₂) units. The result is a polymer whose length controls the material's viscosity and boiling point.

Thermal stability rated high

For high-temperature work, one of the needed characteristics of a fluid is high thermal stability. For a hydraulic fluid, this is the most important factor.

Beyond 600°F, the breakdown rate of silicone fluids is temperature dependent. At 700°F, the breakdown rate for 81717 and 81644 fluids is about 4% per hour, which is somewhat greater than for Versilube F-50.

Breakdown products are low molecular weight silicones, which are noncorrosive, nonabrasive and essentially nontoxic.

Oddly enough, and happily, their spontaneous ignition temperature, 900°F, is as high as the original fluid. The breakdown products are volatile at their ignition temperature and are soluble in the fluid at lower temperatures. They can be removed with conventional de-aeration equipment.

No practical way has been found to inhibit the thermal degradation. However, in hydraulic systems the environment under which the fluids operate tend to reverse the reaction

Fluid properties relative to "Versilube" F-50

Property	Much poorer than F-50	Poorer than F-50	Better than F-50
Viscosity - temperature	Chlorinated biphenyls; silanes; polynuclear aromatics.	Petroleum; poly- glycol; diester; or- thosilicate.	
Thermal stability	Polyglycol; ortho- silicate.	Petroleum; diesters.	Silanes; silphen- lenes; chlorinated biphenyls; polynu- clear aromatics.
Hydrolytic stabil- ity	Orthosilicates.	Petroleum; dies- ter; polyglycol.	
Composite oxida- tion stability	Some petroleum.	Diesters; orthosili- cates; petroleum; polyglycol.	Chlorinated biphenyls; silanes; methyl-phenyl silicones; polynuclear aromatics.
Lubricity, 212°F		Silanes; polynu- clear aromatics; methyl-phenyl sili- cones; methyl sili- cones.	Petroleum; diesters; chlorinated biphenyls; orthosilicates; 81717; polyglycol—(much better).
Lubricity, 300- 400°F		Silanes; polynu- clear aromatics; methyl-phenyl sili- cones; methyl sili- cones.	Diester; chlorinated biphenyl; petroleum; orthosilicate; 81717; polyglycol — (much better).
Lubricity, 500- 700°F	Polynuclear aromatics; orthosilicates; polyglycols; silanes; methylphenyl silicones; methyl silicones.	Diesters; petrole- um; chlorinated biphenyl.	81717; some petroleum with additives.

Questions and answers about "Versilube" silicone fluids

- Q. How do the bulk moduli values for the Versilube fluids compare with values for other fluids used in hydraulic systems?
- A. Bulk modulus is a measurement of the efficiency with which power may be transmitted through the fluid; fluids with high bulk moduli values permit greater power transmission. The bulk modulus for Versilube F-50 at room temperature is about 150,000 psi as compared with 200,-000-250,000 psi for organic fluids. At 700°F, however, the silicone fluids have roughly the same value as the organics, about 30,000 psi.
- Q. Do these fluids create corrosion problems during storage in containers or equipment?
- A. Ordinarily, the fluids are noncorrosive to metals. However, they do not contain rust preventatives, and therefore metal surfaces may corrode when exposed to water or other vapors.
- Q. Are the fluids chemically stable under lengthy storage conditions?
- A. Samples of F-50 have been stored for more than four years without any detectable change in properties.
- Q. Are there dangers of spontaneous ignition or explosion of the fluids during testing at high temperatures?
- A. As with all carbon-containing materials upon exposure to air above the spontaneous ignition temperature, the fluids will ignite. Danger of explosion is

- present only when there is a high concentration of vapors. Under oxidizing conditions the explosion hazard is about the same as when working with formaldehyde, which is one of the oxidation products.
- Q. Are the fluids resistant to irradiation?
 A. No. Large dosages of irradiation attack the chlorine atoms and gellation of the fluid occurs.
- Q. What types of seals are recommended?
 A. Viton-A ring seals have been giving the most satisfactory service.
- Q. What are the problems of foaming under agitation at high temperatures?
- A. The Versilube fluids foam more than the organics presently used, but most of the organics contain foam inhibitors. Some success has been obtained by incorporating special types of antifoam agents. Thermal shock with a nichrome wire will also suppress the foam. At high temperatures the foaming problem is reduced.
- Q. Are there any government specifications covering the use of Versilube fluids? A. No, but there are some in process.
- Q. Are Versilube fluids available in production quantities?
- A. Yes, Versilube F-50, 81644 and 81717 are available in drum quantities.
- Q. What is the approximate cost of the fluids?
- A. F-50 and 81644 sell for \$4.95/lb; fluid 81717, \$5.45/lb.



The development engineer who exercised his option

When it comes to end products, Bill Crowder never finishes what he starts.

While Bill's colleagues were bringing to completion a missile that he initiated, Bill helped launch eight other major projects and some minor studies. A restless record. But that's his privilege in Chance Vought's Development Section.

Bill's department analyzes requirements for new weapons. Specs come from the military, or from Vought's own Advanced Development Planning Group. They outline an approaching void or shortcoming in our defense structure. It's up to Bill and from three to thirty project teammates to produce an idea that will fill the vacancy.

From Development's desks and bull sessions come new configurations. Some are radically different; others, close to conventional. The best are projected, electronically, into the environments they must dominate.

For example, Bill can forecast a proposed missile's flight behavior by studying analog traces and columns of IBM tabulations. Electronically, he can observe minute performance details such as gust effects on a recoverable missile's landing approach.

Tests like these refine from Bill's own offerings and those of others the configuration that best

answers the problem. Once this pattern is "ball-parked" for approximate actual size, it's ready for detail design . . . likely to become a full-scale project.

Time now for Bill to exercise an option all Vought development engineers enjoy. He may follow the project he's begun the full route to completion. Or he may remain in Development and accept a new assignment.

To himself, Bill justifies his choice something like this: "Changing assignments gives me a chance to shift gears . . . to change my approach . . . to broaden myself."

To project engineers, anxious for him to follow a promising project out of Development, Bill's "no thank you" is practically a matter of course.

They know he's already cleared his desk for the next new challenge.

At Chance Vought the Development Engineer explores a unique variety of configurations and operational environments. He may limit his analyses of land- and sea-based weapons to preliminary design studies, or he may accompany his project through the complete development cycle.

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THE SOLDIER

Much more than the H-Bomb is needed to insure our total security.

For the threat of massive retaliation is not a complete deterrent to aggression. Border incidents and "brush fire" wars cannot be handled by nuclear weapons alone.

What kind of military program, then, do we need? The consensus of top military strategists answers it this way:

We must have forces capable of meeting every aggressive threat, adaptable to the strength and skill of the aggressor and to the terrain, climate and geographical factors in the military problem involved.

This means the mobile, lightning-fast soldier of the new Pentomic Army...the man on foot with a gun in his hand, artillery behind him, and the full might of our entire arsenal readied for his support. For this man is the military policeman upon whom the keeping of the peace must always heavily depend.

Martin is a prime contractor to all branches of the military. Among the most advanced weapon systems currently being produced for the soldier is LACROSSE. As the prototype of a new family of artillery guided missiles, this important weapon is one of the basic developments of the Army's advanced Pentomic concept.



and discourage the forming of breakdown products. Even under moderate pressures, such as 1,500 psi which is obtainable with most aircraft hydraulic pumps, the breakdown tendency is greatly reduced.

Two other properties dictate the choice of an hydraulic fluid: lubricity and viscosity. Fluid 81717 far exceeds other silicones in lubricity and, according to GE, "equals most natural or synthetic lubricants." The viscosity characteristics, as with all silicone fluids, are excellent.

For an engine oil, the most important property is lubricity. Next comes oxidative stability and thermal stability, which play equivalent roles in second place. To show this combination of factors to best advantage, GE devised fluid 81644. Its oxidation threshold temperature is above 500°F. Oven life of many hundreds of hours have been recorded below this temperature.

Above the threshold temperature, the oxidation rate is both catalysis and temperature dependent, and is extremely low. At 550°F, the oxidation rate is about 0.2 mole O₂/mole fluid/hr.

Better pumps needed

From an engineering point of view, more than a satisfactory lubricant is wanted. There are design problems that must be solved simultaneously, ones comprising materials of construction, seals, pumps and deaeration equipment. Where, for example, is there a 700°F pump that can take advantage of these new silicone fluids? And where are there 700°F seals? Maybe Viton-A is one answer to the seal problem. So far they have not been tested above 600°F, because high-temperature pumps are not available.

GE has found that many of the "standard" tests, such as those prescribed for viscosity and thermal stability measurements, had to be revaluated and new techniques devised. Several pieces of specially devised company equipment have already been taken over by a part of the aircraft industry, which is making its own lubrication studies.

When GE engineers speak of developing semiorganic silicones for the 800°F range, they see some promise but not necessarily probability. However, the hope of getting a stable organic fluid for the 800°F range is zero. Above 800°F, liquid metals may have to be used.

GE points out that the lubrication identity is only one of many for silicones. The materials are also used in electrical insulations and in hightemperature paints.

In the latter, an appropriate silicone put in as an additive is reported to give the same corrosion resistance as stainless steel. Such paint is being used on some powerplant parts. Silicone gaskets are also finding increasing use in high-temperature environments.

NO

ENGINEERING

Grumman engineers speed, STOL into Mohawk

Grumman's Army AO-1 Mohawk high performance observation airplane, when it takes off on its first flight sometime in 1959, will mark a design achievement bridging two eras of aero-

nautical engineering.

Advanced airframe and powerplant concepts will give the Mohawk the performance and maneuverability of a World War II fighter, yet permit the short takeoff/landing features re-quired to meet present day military operational needs.

A 5-to-1 speed range has been achieved with a top speed of 275 knots and a 55-knot stall speed. The AO-1, and its OF-1 Marine counterpart, will be able to take off in a 600-ft. run and land within 400 ft. over a 50-ft. ob-

Stacle.

Rate of climb is 3,000 ft. per minute and present service ceiling is about 25,000 ft., although ultimately the latter figure reportedly may go as high as 32,500 ft.

The airframe and its Lycoming T53 free-turbine turboprop engines will undergo planned improvements, according to Grumman officials. It is anticipated that night and all-weather operational capability will be obtained in future development by the addition of radar and infrared scanning equipment, and modifications for thermal de-icing of wings and fuselage. Initial version of the Mohawk has provisions for alcohol spray and warm air de-icing of the cockpit windshield only.

The AO-1 is designed to a joint Marine Corps-Army specification under Navy cognizance, and is the first airplane application of the Lycoming T53

Structural design

The airplane structure is of conventional stiffened light-alloy sheetmetal construction, and has been designed to a maximum load factor of 5 g. However, design details reveal that Grumman has expended a great deal of effort to achieve low weight and ease of manufacturing.

All nonstructural doors and panare made of magnesium. Chemmilling has been used extensively to remove excess material wherever pos-

For instance, although duct tubing has to have appreciable thickness to prevent buckling during bending and forming operations, the finished shapes are subsequently chem-milled to the minimum thickness needed to do their

The fuselage lines have been lofted without double curvature everywhere except at a small nose portion, virtually eliminating the use of formed skins. Fuselage skin can be wrapped on directly from stock, simplifying pro-

High lift is obtained from the relatively small wing by means of fullspan retractable leading edge slats plus slotted flaps, both hydraulically actu-

Attachments are provided on each wing for a 1,000-pound store (usually an external wing tank) outboard, and two inboard stores (usually marker rockets) up to 500 lbs. each.

The Mohawk's low drag charac-

teristics have necessitated installation

instruments. Provisions are made for a two-man flight crew. Crew protection includes plastic composition "flak" curtains and thick aluminum alloy armorplate behind and beneath the cockpit, and at its sides.

Low-level ejection seats

Two Martin-Baker type low-altitude ejection seats are installed, and an overhead roof panel opens automatically when an ejection seat is operated. However, as a safety factor in the event of roof panel remaining closed, there is no metal framework directly

Specs on Grumman AO-1 Mohawk

Tail height 15 ft., 7 in. Aspect ratio 5.35 Weight empty7,772 lbs. Overall length 42 ft., 9½ in. Power plants	Internal fuel, JP-41,666 lba External tanks2,150 gallons each Takeoff power1,005 eshp each
Maximum speed @ 5,000 ft., military pow Stalling speed @ sea level, 10% power	er
Rate of climb, 2 engines, normal power. Rate of climb, 1 engine, military power Endurance, internal tanks, 5,000 ft, altitude	1,050 ft./min.
250 knots cruise	Ferry Mission Full internal tanks, 2,150 gallon external tanks, no rockets. Cruise at 208 knots at 25,000 foot altitude. Range

of hydraulically-operated dive-brake flaps in the fuselage sides to eliminate the possibility of exceeding its critical Mach number during a high-speed descent.

Special skis may be attached to the conventional tricycle landing gear to provide capability of landing on mud, snow or water, and are retractable with the hydraulically operated wheeled

Installation of the skis reduces the useful load by approximately 350 lbs., and speed by about 6 knots.

Tail, cockpit details

The horizontal tail assembly is mounted near the top of the fin to clear propeller slipstream and wing downwash in all flight attitudes, and to be unaffected by dust, stones, ice, etc. The tip location also provides an aerody-namic end plate effect on the vertical tail assembly which improves rudder performance during single-engined op-

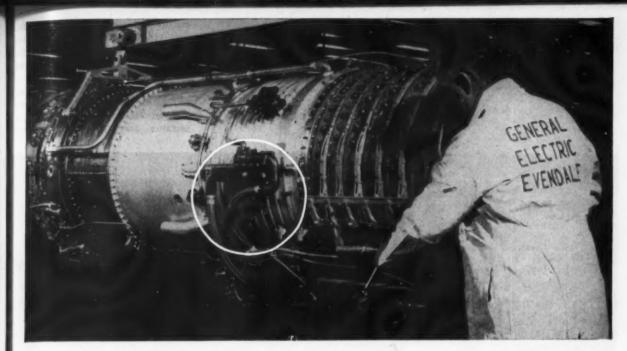
Cockpit layout is of the conventional side-by-side configuration with compact arrangements of controls and

above the crew members, and the Plexiglas in this region is thin enough to permit its fragmentation during ejec-

The generous expanse of transparent material in the bubble-canopy type design provides exceptional visi-

There is 22-degree down visibility straight ahead, and it is possible to see a point as low as 50 feet directly below the airplane by leaning out slightly. The large windshield panels are provided with external alcohol spray de-icing in conjunction with hydraulically operated wipers, plus an internal hot air supply for defrosting purposes.

The Mohawk carries a full complement of navigation and communications equipment installed in a fuselage compartment behind the wing, which is readily accessible by removing a large detachable fuselage panel. Partial equipment list includes HF, UHF and VHF receiver-transmitters, intercom system, Tacan navaid, marker beacon, LF direction finder, VHF homer and IFF equipment.



On the J79 Engine for the Fast, New F-104A, Aeroquip 601 Lightweight Engine Hose

SAVES WEIGHT Aeroquip 601 Lightweight Engine Hose offers weight savings of 44% in the —10 size, compared to standard MIL-H-8794 hose. Other sizes are similarly lighter. The resultant weight savings contribute to higher performance and speed required for today's—and future—aircraft.

SAVES SPACE Aeroquip 601 Lightweight Engine Hose is highly flexible, permitting smaller bend radii in highly confined spaces. For example, the —3 size has a minimum bend radius of 134", 42% smaller than comparable MIL-H-8794 hose. This extraordinary flexibility is a prime consideration in more compact engine design.



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Get full technical information on the weight and space saving performance of Aeroquip 601 Light-weight Engine Hose and other high performance Aeroquip Hose Lines with Reusable Fittings. Write today for aircraft catalog 102.





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New York to Paris in 15 minutes

Before the present century ends, authorities have said you will be able to board a rocket and cross the Atlantic in minutes. Or circle the Earth in an hour . . .

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This is being brought about because of practical research on problems that need answering now. At Douglas, for instance, work to cushion sensitive



instruments against the tons of gravitational pull they meet in a rocket take-off tells much that will help protect passengers in a rocket ship. Improved aerodynamic design for supersonic fighters suggests more efficient airframes for rockets. The control system which will permit directing the Douglas Thor missile to a target

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1500 miles away leads to controls for tomorrow's rocket ships.

Today, Douglas engineers work in fields ranging from atomic power to electronics, thermodynamics to acoustics. You see the results in skies around the world, in aircraft, rockets and missiles for all of our armed





Thor, new intermediate range ballistic missile developed for the Air Force by the Douglas Aircraft Company is still a hushhush project. Thor is designed to carry a thermonuclear warhead at meteoric speeds . . . when operational will supplement the manned bomber force of the Strategic Air Command. Douglas is now building three basic types of rocket and missile: air-to-air, ground-to-air, and ground-to-ground.

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The new pride of Eastern... PROTECTED BY SINCLAIR

Latest Eastern Air Lines plane to bear the illustrious Golden Falcon name is the Super G Constellation. This new titan of the skies carries 70 passengers — has an increased cruising range and includes 107 new design features. It embodies new luxury, style and comfort — retains its traditional dolphin-like grace and triple tail.

Its four great Turbo Compound engines that generate 13 thousand horsepower are protected with Sinclair Aircraft Oil. Eastern uses Sinclair Aircraft Oil exclusively because of its proved quality and dependability over the years. In fact, today 45% of the aircraft oil used by major scheduled airlines in the U.S. is supplied by Sinclair. There's no better proof of reliability.

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Sinclair Refining Company, Aviation Sales, 600 Fifth Ave., New York 20, N. Y.



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AMERICAN AVIATION

NOVEM

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GE study shows feasibility of short-run automation

by Henry P. Steier

AUTOMATION of short-run production is feasible, both technically and economically, and if approached on a systems-planning basis can be effected on a piecemeal basis and still be economically justified.

This is the conclusion of a fouryear study by a task force established to develop automation within General Electric Co.'s Light Military Electronic Equipment (LMEE) Department.

Chairman of the task force, A. F. Maynard, and three of its members, E. Suuronen, L. E. McCabe, and R. P. Milioto, reported on the study at the recent East Coast Conference on Aeronautical and Navigational Electronics.

In carrying out their assignment, the task force coined the term "automatology" to express their concept of an automation philosophy as a systems concept that covers establishment, development and application of automation, and uses an approach covering much more than just utilization of machinery.

From its work, the task force developed these basic concepts:

An apparently incompatible business can be reshaped into a form to which automation can be applied.

Best approach to automation is on a long-range basis using systems planning. Such a program justifies itself economically even when applied in piecemeal fashion.

Systems planning required is selfsupporting because findings increase productivity and reduce costs even though across-the-board automation may not be achieved.

Ideal equipment for automating operations is not normally available on the open market. So a do-it-yourself concept must be used with knowledge of specific needs coming from a permanent systems staff.

Cardinal point in the systems approach through automatology is not to restrict an automation program to a single area, such as manufacturing.

Although the task force admits this principle was adopted initially as a matter of intuition, three years' experience has shown it was correct.

First year of GE's study was spent in learning the benchmarks and boundary lines of LMEE business and relationship between functional units in the department.

Initial projects undertaken in the stems approach were:

Manpower analysis, in which each lob was broken into distribution of work elements as clerical, manual, supervisory, creative and manual service.

Analysis of components used in



DRAWING of electronics chassis being reduced to tape on GE drawing-to-tape programmer. Perforated table contains all possible holes where drawing grid lines might intersect. Operator pushes stylus through drawing at line intersections and tape is automatically prepared for directing punch press.

100 representative subassemblies chosen at random from current production. This indicated the common denominators, such as lead wire size, body size, etc. of resistors, capacitors, etc.

Analysis of relation between set-up time and applied time by direct labor in the fabrication section.

Data handling analysis. Job-lot production characteristic of LMEE products makes for a high engineering content and this led to conclusion that automation would be very desirable: 26.6% of total LMEE personnel are involved in data processing, of which 80% is automatable.

Next step was to find common denominators among products, components, materials, processes or methods which could be combined to establish volume to make them compatible with automation.

These denominators might be created by bringing together common likes, or they might be created through engineering standards.

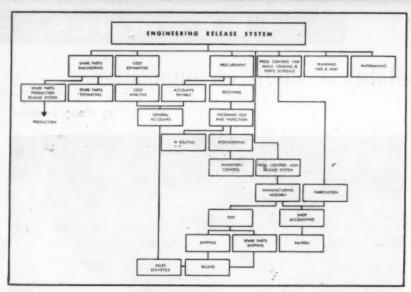
In the GE case, location was established as the common denominator that made it possible to accomplish mechanization in areas of detail drafting, fabrication, assembly and testing.

A problem that often seems unsolvable is application of automation to short-run production shops which produce unit quantities from a few to a thousand. It is in this business that most manufacturers say it cannot be done.

LMEE's work is typical of that of many companies building military electronic equipment, where tooling must be done for initial low quantity orders that might become high quantity production. This is the pattern of the military industrial preparedness program.

Much of this work concerns fabrication of sheet metal parts and machined castings combined with electronics components and wire. Characteristic of this work is the large number of engineering changes as advances in electronics are made.

TION



FUNCTIONS integrated by punched card data processing in GE LMEE department. For some data jobs GE built its own machines. Development and building costs for system were written off as savings in first year's operation.

In fabrication cost, tooling is a high percentage element. The tendency in many companies has been to use the same special tooling for short-run as for medium-run production quantities because the automation situation looked hopeless.

GE's study concluded that the way out of this dilemma was to create a new scheduling and inventory situation by developing these aids: multipurpose machines; universal tools; universal fixtures; universal positioning systems; programming techniques; product design standards.

It was recognized that automatic machine tools have appeared on the market recently. Some of these are

tape and card machine tools, protrols working from conductive ink drawings and templates, record-playback schemes that record manual operations and then automatically play-

However, cost of such equipment is out of reach for many users because

To get around these handicaps, GE adopted these three system-planned developments for short-run production: One-tenth inch grid as a product

design standard.

A drawing converter for transforming instructions on a drawing into

grammed positioning tables, tracer conback for production lot quantities.

a whole family of such machines is needed to do a complete job.

tion, GE has found reduced costs po across the board. They are realized in

The savings, GE says, would be of much less value, however, if the system concept did not apply equally to printed wiring boards and frame many

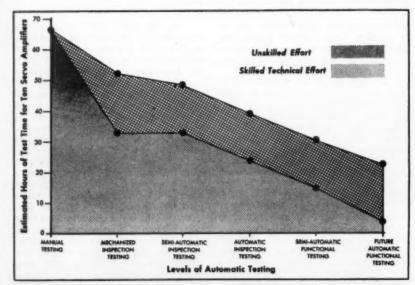
Carrying the automation savings beyond the engineering-to-fabrication cycle, GE moved into the area of quality control.

Three main functions in quality control are process control, functional

Taking a conceptual model consisting of 10 production units, the task force determined the effort needed for testing.

It took a skilled technician 66.4 hours to test them. First step to reduce the time was taken in 1949 by using relatively simple machine known at 1 Foster Analyzer. It measured con nuity and resistance, and was co nected to units by multicable connec tors.

The machine reduced test time 52.7 hours, of which 19.7 could be performed by unskilled operators. In 1953, a stepper-switch-pro



TEST HOURS required for different degrees of automatic testing tried by GE on typical equipment. Ratio between skill requirements is shown for different automaticity levels.

punched tape form.

Work positioning system which converts punched tape instructions into machinery or tool control.

When a piece of electronics gear is designed, the designer makes a double scale layout using a grid of lines spaced 0.2 inch apart. Intersections of lines denote points at which hole centers are placed.

This drawn information is transformed to tape by a machine consisting of a work table and a movable stylus When the stylus is depressed at a spot indicated on a drawing, information regarding hole size and location is punched on the tape.

In the factory, the operator places the tape on an automatic punch press, inserts the tape and work piece and presses a button. The coded tape tells the machine what to do until all holes are located and pierced.

The same system is applied to cutting lengths of tubing used in fabrica-tion of frames to hold electronic equi-ment. Positioning, trimming, cutting to length and disposing of scrap is automatically done.

The entire frame assembly dimensioning conforms to the one-tenth inch standard applied to the hole-punching operation.

Placing machine designed

Carrying the systems idea further, GE also applies the one-tenth inch standard to printed wiring board assemblies. An automatic component-placing machine was designed on the tenth inch standard. However, miniaturized designs, which came after the machine, now show that more universality was needed in the component machine.

In the automated piercing opera-

facture.

testing and reporting.

MISSILE SYSTEMS THERMODYNAMICS

Weapon systems activities under Lockheed's management are encountering thermodynamic problems of a most advanced nature. Projects at the Palo Alto and Sunnyvale organizations present unusual scope for achievement in thermodynamics areas including: Boundary layer and heat transfer analyses in hypersonic flow fields such as pressure gradient and real-gas effects; analysis of thermodynamic performance of missiles in continuum flow, slip flow and free-molecular flow; calculation of transient structural and equipment temperatures resulting from aerodynamic heating and radiation; specification of ground tests and flight tests required to verify and improve thermodynamic design of missile and weapon systems; analysis and interpretation of thermodynamic ground test and flight test data. Inquiries are invited. Please address the Research and Development Staff, Palo Alto 49, California.

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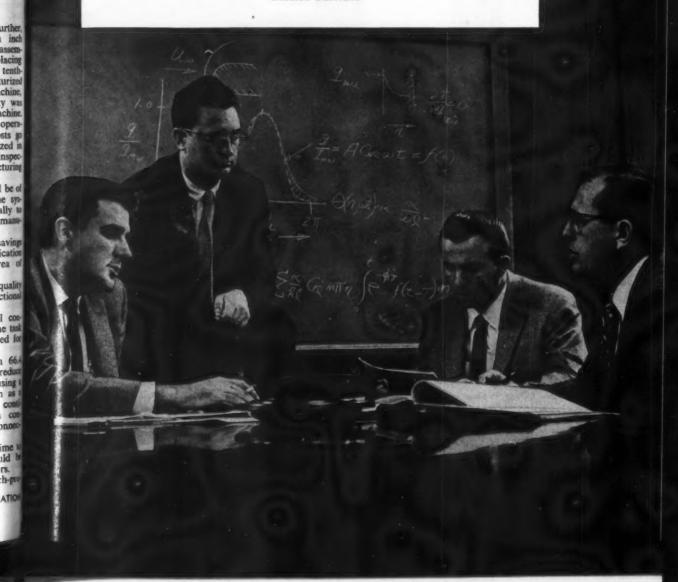
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h inch inching Aerothermodynamic Staff members discuss heat flux during reentry of a hypersonic vehicle. Left to right: J. I. Osborne, aerodynamics; R. G. Wilson, thermodynamic research; W. E. Brandt, thermodynamic analysis; Dr. L. H. Wilson, Thermodynamic Section head.

Lockheed MISSILE SYSTEMS

A DIVISION OF LOCKHEED AIRCRAFT CORPORATION

PALO ALTO · SUNNYVALE · VAN NUYS
CALIFORNIA





INTERNATIONAL AIRLINES USE ESSO AVIATION PRODUCTS

grammed-inspector was developed to do the same job as the Foster Analyzer but in automatic sequence and by push-button control.

As applied to a servoamplifier unit used as one model, this new equipment cut testing time on 10 units to 49.4 hours, of which 33 were by skilled and 16.4 by unskilled labor.

Fully automatic equipment was first used in 1954 and cut test time to 39.3 hours, with skilled labor taking 24 and unskilled 15.3 hours. One of the automatic testers was Color Television Inc.'s Supertester equipment, which was available on the market.

Time was cut to 30.3 on the servoamplifier. Ratio of skilled to unskilled time was 15 and 15.3 hours. It was finally realized that to get the most out of automatic testing potential, quality control and engineering should work together in systems team

In future automatic testing, the GE automation group hopes to reduce test time on the 10-unit sample to 21.9 hours, of which skilled to unskilled ratio is 3.3 to 18.6 hours.

The machine to do the testing will be relatively expensive. It will include a tape reader, programming, recording and measuring of ac and dc voltages, phase shift frequency, time interval, etc.

Digital voltmeters that can measure from 10 millivolts to 1,000 volts

with 0.1% accuracy in less than a second are available. Some do it in microseconds and this leads to optimism about possibility of automatic waveform analyzers.

LMEE business is subject to the mountains of paper handling typical of business today. The task force found the volume of paper processed each year at LMEE was more than six million pieces.

Half of this load is due to normal designing and product building accounts. Government and employe requirements, control activities, etc., account for the remainder.

The task force concludes that 80% of this paper load is automatable. Oddly, it represents the reverse of the fabrication automation situation where low volume is the problem.

Ideally, a data processing system would permit direct control of factory machines during the design cycle of the product. The task force believes this is possible if a new organization of the manufacturing system is considered.

At this time, planning, material procurement and production functions are interposed between engineering and direct labor operations. To accomplish direct machine control these functions must be aligned side by side with engineers to get parallel input to the data processing machinery.

Such a scheme would, for example, aid in relieving such duplication of effort as exists in reuse of engineering information which is permanently stored on drawings. In actual practice, GE says, the majority of planning, production and procurement efforts stems from such reuse.

What is needed is a centralized memory storage that contains all records in a form accessible upon demand at the point of use. The task force believes technology for such a system is available, but the systems planning and economic justification are the unknowns.

In 1954, a digital computer was considered, despite the fact that "there was no confirming evidence of actual applications successfully accomplished, and existing machines had been designed for scientific and engineering calculations."

No computer to do the idealized job was available. Some idea of the magnitude of this job is indicated by the fact that LMEE's finance records alone would require a computer with a memory capacity of 77,893,000 characters.

Task force member Milioto said that "since it was necessary to build the new railroad station without interrupting traffic, an integrated data processing system using punched cards was implemented."

New Bendix SM-E Connector

(smaller, lighter than AN-E but equally dependable)



Here is the newest in the ever growing family of Bendix* environment resistant connectors. The new SM-E Series (Short "E") will provide the same performance as the standard AN-E connectors, but is shorter, lighter and more easily serviced. Not only does this connector conform to the vibration resistant requirements of the "E" connector in the MIL-C-5015C government specification, but it also provides effective moisture barriers both at the solder well ends and mating surfaces using the full range of wire sizes. Of particular interest to production and maintenance people is the back nut design, which provides a jacking action on the grommet during disassembly, thereby lifting it free of the solder wells. This feature when combined with the new Bendix "slippery rubber" grommets makes easy work of wire threading and grommet travel over the wire bundles.

Available in all standard AN shell sizes and tooled for most of the popular AN configurations.

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Are major airline mergers around the corner?

by Selig Altschul

DISCLOSURE by the New York Central and Pennsylvania railroads that they are studying the possibilities of a merger is not without implications to the air transport industry.

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For one thing, this railroad move immediately leads to conjecture as to mergers in the airline group. Further, the reasons advanced by the two giant railroad systems for examining the desirability of a merger touch directly on operating circumstances of the airlines.

Declining participation in the country's transportation market and a slide in earnings are motivating factors for the railroad merger study. The railroads have lost considerable freight raffic to the trucks. But they have lost substantial passenger business to the airlines.

For example, in 1949 the nation's railroads reported a total of 36 billion revenue passenger-miles, or 49.58% of the total intercity passenger-miles of all transport media. The scheduled airlines for that year contributed some 6.7 billion revenue passenger-miles, and accounted for 9.24% of the total intercity market.

By 1956, the railroad industry was able to show only 28.5 billion in revenue passenger-miles, or off some 21% from 1949, and only 40.7% of the total intercity market. On the other hand, the scheduled airlines were able to generate 21.6 billion revenue passenger-miles in 1956, up 222% over 1949 and representing a healthy 30.9% of the total intercity transport market.

Rails lose on passengers

There can be no doubt that the airlines have generated a substantial volume of new traffic that never existed before. It is equally true that railroad passenger traffic has been directed to the airlines. And, ironically, most railroad managements, privately or otherwise, wish that the airlines would now take all of the remaining passenger rail traffic. Most of the rail passenger business as served by existing schedule patterns is handled at a whopping loss to the railroads.

A key objective of the projected railroad merger is to attain greater volume through increased efficiency by a concentrated utilization of facilities. For instance, moving more trains and traffic over a given set of tracks produces a better operating ratio and in the end results in an improved net profit. In short, railroads are fighting the bogey of "high operating ratios."

And high operating ratios with their concomitant of disappearing profit margins are even more pronounced in the air transport industry. Furthermore,

this condition has been greatly accentuated by the extensive route certifications which have brought about a multiplicity of competition for all of the trunk air carriers. While airline traffic has strong growth characteristics, the available business in most markets now has to be shared by more operators. This thins out load factors, in-

This thins out load factors, increases sales, promotional and other expenses, and in substance is responsible for higher operating ratios for all of the individual domestic airline.

It is this squeeze on profits turning into deficits and exerting its inevitable erosion of financial resources that may well ultimately serve as one reason for a series of airline mergers.

Airline parallel

The splash of the New York Central and Pennsylvania railroad announcement to be equaled in the air transport industry would require the boldness of a proposal that American and United were examining the possibility of a merger. These two domestic airlines have the largest annual gross revenues and are as comparable in their field as the Central and Pennsy are in theirs. However, the similarity begins and ends there, as far as the consummation of any merger between the two airlines is concerned.

But at some point there will be a number of airline mergers. A new controlling reason entering the picture is the advent of the large jet transports. The cost of this equipment and its profitable utilization may well preclude the relatively smaller carriers from acquiring such aircraft.

Certainly, there is little to indicate that mergers among the airlines are imminent. With various pending route cases awaiting final CAB determination, any interested carrier is likely to make certain that it will receive all the awards it can before entering any merger discussions.

The Board, at one time, demonstrated a keen interest in strengthening the industry through mergers. Extensive new route awards throughout the industry are moves in the opposite direction and defeat the objectives envisioned by mergers. Ironically, this over-certification may serve one day to hasten the day of merger discussions.

When that day comes, the merger road will not be an easy one to traverse.

The present atmosphere surrounding certificated airline life simply is not conducive to voluntary mergers. The free play of economic forces is not permitted to operate in the regulated

air transport industry. There is no real incentive to negotiate desirable consolidations, under existing conditions.

dations under existing conditions.

Moreover, the CAB just does not have the power to compel airlines to merge. It can, however, prod in both official and unofficial actions. Control over the award of mail compensation and implied certification of new and competing routes are powerful weapons in this respect, but the Board may be most reluctant to move.

In unregulated industries it has not been uncommon for strong units to acquire weak companies that could not weather the financial storm. But in the certificated airline industry, natural economic forces remain suspended. Holders of permanent certificates of public convenience and necessity, as long as they have the right to mail pay, can expect to remain in business. It was this factor that permitted a number of marginal airlines to survive the difficult postwar readjustment period.

Even if voluntary mergers were proposed, they would be headed for tough sledding. The airline merger path is a most intricate one, beset by many obstacles. Many have tried, but only two bonafide mergers have been consummated since the Civil Aeronautics Act of 1938 was enacted.

Hurdles are many, complex

For the trunk lines holding permanent certificates, the hurdles have been many and complex in attempting to effect some desirable combinations. Physical assets are not difficult to appraise. But placing a price on a "franchise" is a troublesome issue and many a proposal collapsed in the attempt.

Strong personalities of airline chiefs also have clashed in the showdown on who was to become head man in any merged systems. Then, once agreement at the top level is accomplished, proposals must obtain the sanction of the separate boards of directors and after that, approval from stockholders. Dissident groups can place any compromise in jeopardy.

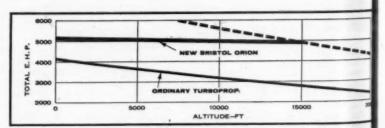
Biggest obstacle remains in obtaining CAB approval. Board approval is required of any consolidation merger, lease, operating contract or acquisition of control of any certificated carrier. The Board must find that such proposed arrangement is in the public interest. The law directs the Board not to approve any arrangement which would "result in creating a monopoly . . . or jeopardize another air carrier not a party to the agreement."

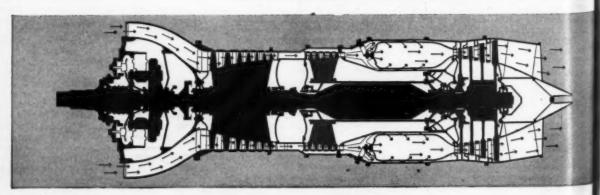
It is this threat of impairing the interests of "another air carrier" which may prove particularly troublesome.

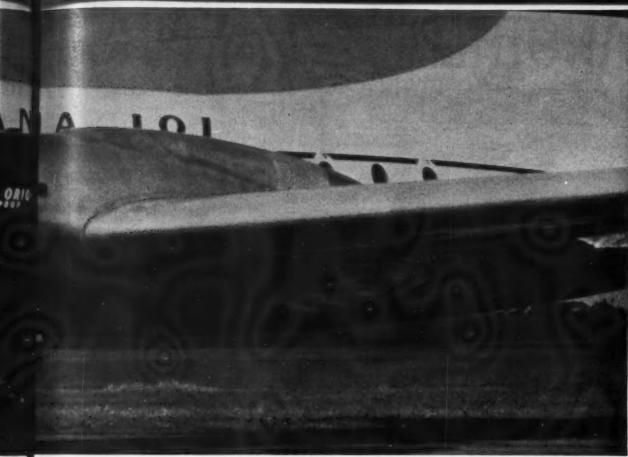


MIGHTY NEW BRISTOL ORION:

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The Bristol Orion is now undergoing development-flying in the Bristol Britannia

World's first supercharged turboprop

These were the demands that Bristol designers succeeded in meeting when they designed the Orion:

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Facts on the mighty new Orion

A two-spool constant-power turboprop. Take-off rating, $5,150~\mathrm{chp}$.

Orion's twin compressors. Work split between low and high-pressure stages is arranged to allow both stages to run near maximum adiabatic efficiency. The twin-spool layout also leads to unprecedented flexibility of operation.

Advantages of "Gating." Orion is an 8,000-horsepower engine deliberately throttled at sea-level. At 30,000 feet and maximum cruising power it delivers 3,960 ehp. By restricting output to 5,000 hp from sea-level up to 15,000 ft, propeller and reduction gear can be lightened—giving marked reduction in specific weight.

Yet for take-off at high temperatures or elevations, the Orion can be given its head by simply opening the throttle—water-injection and other power-boosters are unnecessary.

Phenomenal Economy. Specific fuel consumption of the Orion is well under 0.40 lb/ehp/hr. This phenomenal economy makes it possible to achieve long-range, low-cost transport of high payloads.

Orion-powered airliners could operate at 550 mph—displaying journey times competitive with pure jets—but at a fraction of the cost.

The famous Bristol engine family. Bristol Aero-Engines Limited also produce the well-tried, economical Proteus turboprop—powering the Bristol Britannia; the high-power, low-consumption Olympus turbojet; the lightweight Orpheus turbojet; the Thor ramjet—in production for the Bloodhound S.A.M. Constant research activity ensures that Bristol will continue to lead in bringing power to the wings of the world.

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TRANSPORT AVIATION

East vies with West in worldwide turbine race

Russia unveils a 220-passenger turboprop, as Boeing rolls out first 707; Electra near rollout; DC-8s on line

by Anthony Vandyk

ROLLOUT of the first production U.S. jet transport and unveiling of Russia's huge Tupolev Tu-114 are the most recent top events in a series of highly important developments involving turbine transports now taking place. Jets and turboprops also are in the news in The Netherlands, Britain, France, East Germany and Canada, as well as here and in Russia.

here and in Russia.

The first production Boeing 707 was rolled out Oct. 28 and is scheduled to fly "sometime between Christmas and New Year's Day." This is the first of six 707-120s ordered by Pan American World Airways. Delivery of the 157-powered aircraft is scheduled to begin in December 1958. Boeing now has orders for 151 jet airliners.

The 707's chief competitor, the DC-8, is in final assembly at Douglas Aircraft's Long Beach plant. It is

The 707's chief competitor, the DC-8, is in final assembly at Douglas Aircraft's Long Beach plant. It is scheduled to roll out in February, fly in March. PAA also will be the first airline to get this jet transport—in June 1959. Total orders for the DC-8 involve 123 aircraft.

At Lockheed, the first Electra turboprop transport is near rollout and should emerge by December 1. Five other Electras are in final assembly and all six will be used in a high-priority engineering program designed to get certification of the aircraft by September 1958 when deliveries are due to start to Eastern Air Lines. Lockheed has sold 144 Electras to date.

Convair is making steady progress on its 880 jet, but the aircraft is far less advanced than the 707 or the DC-8, since it is not scheduled to roll out until November of next year. Meanwhile, Convair salesmen are beating the bushes for new orders—present contracts involve 48 aircraft. Convair is also working on turboprop and wingtip jet versions of the Convair 440 for operators desiring to enter the turbine era with this well-proved airframe.

On the other side of the world, Russia's Tupolev Tu-114 Rossiya has been unveiled. Powered by four 12,000-hp turboprops this aircraft grosses well over 300,000 lbs. It will be capable of carrying 120 passengers from Moscow to New York in 10 to 12 hours. On flights of 800 to 900 miles, passenger capacity will be available for 200 persons. According to the official Soviet announcement the aircraft has "two elevators and a restaurant for 48 persons."

From Russia's East German satellite comes news that the four-jet BB-152, 40- to 60-passener transport, will be flying by next spring. It will have a range of about 1,500 miles and will cruise at 500 mph. A particular feature of the BB-152 is its ability to use small fields.

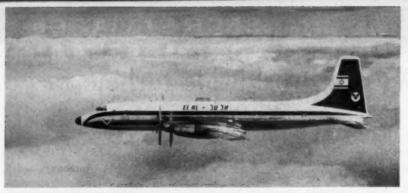
From The Netherlands there is news of importance to the U.S. local service airlines and Fairchild, as well as for Fokker Aircraft Co. On Oct. 29 Fokker was given a CAA typecertificate for the F-27 Friendship turboprop transport. The aircraft was certificated for an increased gross takeoff weight of 35,700 lbs. Zero fuel weight and maximum landing weight



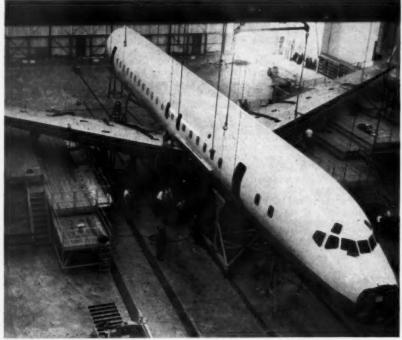
FIRST production Boeing 707 was rolled out in Renton, Wash., Oct. 28. Scheduled to go into service with PAA early in 1959, the aircraft will start its flight test program at the end of this year.

NOVEMBER 18, 1957

TION



EL AL ISRAEL AIRLINES has taken delivery of two of its four Britannias and soon will introduce the turboprop transports on the North Atlantic route. Bristol has delivered about 20 of the 70 Britannias on order.



FIRST Douglas DC-8 is on the final assembly line at Douglas' new \$20-million plant at Long Beach, Calif. Aircraft is scheduled to roll out in February.

remain unchanged at 32,400 ax 34,000 lbs., respectively. The first production Dutch-built F-27 is due to roll out in April.

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Fairchild is still hoping to rel out the first U.S.-built F-27 near month. The aircraft will fly early next year and the first production to livery is scheduled for March. Fairchild now has orders for 57 F-27s.

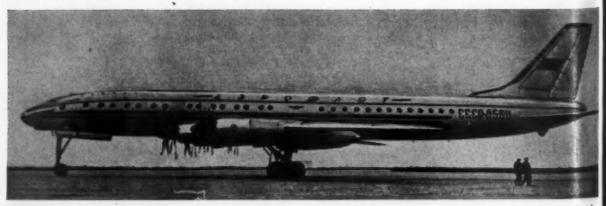
Another East Coast manufacture, Republic Aviation Corp., is soliciting airline reaction to a four-turboprop transport design study for which the name "Rainbow" has been revived Although the company has disclosed no details, the aircraft apparently is in the small/medium-sized bracket and somewhat resembles the Viscount.

Details of the Rainbow are contained in a package sent to leading airlines throughout the world by Robert Hewitt Associates, Inc., Ridgewood, N. J. Prepared on Republic; behalf, this "market study" includes a lengthy questionnaire aimed to ascertain airlines' precise requirements for future equipment. Republic still professes to be interested in building the Caravelle if demand warrants.

Meanwhile, in France, Sud Avation has announced details of its Carvelle production program involving some 280 French companies as well as U.S., British and Italian manufacturers. A monthly production rate of four aircraft will be reached in May 1960 and, if necessary, this can be increased to seven a month. The first production Caravelle will be rolled out at the beginning of 1958.

In Britain, Bristol is completing the Britannia orders of El Al Israel Airlines and Aeronaves de Mexico. Both these carriers intend to introduce the turboprop transport on their routes in a few weeks. New orders for the big plane are slow in coming in. If the aircraft is not certificated by CAA by May 1, Bristol will lose the deferred Northeast order for five aircraft.

Meanwhile, Short Bros. & Harland has designed a development of the Britannia, seating up to 194 passengers and using the Britannia wing set up above a new, longer fuselage.



RUSSIA'S Tupolev Tu-114 Rossiya is powered by four 12,000-hp turboprop engines driving contrarotating props. Intended for intercontinental service, this giant aircraft is currently making experimental proving flights over Aeroflot's system.

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Powerplants would be Orion instead of Proteus turboprops. Another Britannia development is the commercial version of the CL-44 military transport announced by Canadair (AMERICAN AVIATION, Nov. 4), which also will have the Orion as its powerplant.

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Vickers-Armstrongs, which has built most of the turbine transports currently in service, has delivered some 240 Viscounts to date and has sold 374. Delivery can be given in 12 months. The present average rate of production is 10 aircraft a month. Production tooling for the bigger Vanguard turboprop transport, 40 of which are on order, is building up while the design office is busy on the VC-10 jet transport, 35 of which have been ordered by BOAC. The first Vanguard is scheduled to fly in the fall of 1958, with the VC-10 following about three years later.

Britain's third major manufacturer of turbine transports, de Havilland, is still trying to revive interest in the Comet. Work is proceeding on BOAC's order for 19 Comet 4s and on the six Comet 4Bs ordered by British European Airways. BOAC is due to start taking delivery in the latter part of 1958, while BEA will get its aircraft about the end of 1959.

It is not generally known that there are 14 Comets currently in service—two civil Comet 2Es operating with BOAC in tests of the latest Avon engines; 10 Comet 2s with RAF Transport Command; and 2 Comet 1As with the Royal Canadian Air Force.

In the Soviet Union, the Tu-104 is proving highly successful, although no money-maker, in service with Aeroflot. Western observers estimate that about 40 of these aircraft have been built. At the beginning of December, the first Tu-104 service to a western airport will be inaugurated when the Russian airline puts the jet on the Moscow-Copenhagen route. Czechoslovakia's CSA airline is currently taking delivery of three Tu-104s and after using them initially to Moscow will fly them to western Europe and the middle east.

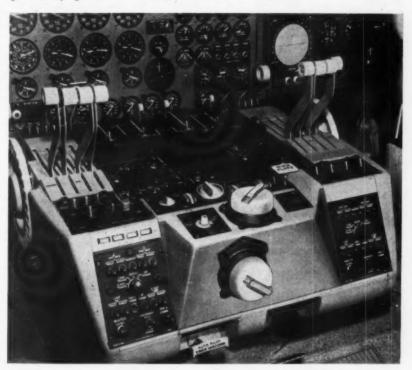
Within the Soviet Union, proving flights are continuing with the Tu-110, four-jet version of the Tu-104, the high-wing four-turboprop Antonov Ukraina and the Electra-like Ilyushin Il-18 turboprop transport. These air-craft are likely to enter service with Aeroflot sometime in 1958.

It is clear from studying the air transport scene on both sides of the Iron Curtain that no one is sure whether the turboprop or the turbojet is going to predominate on the shorter routes of the world. In the longhaul field, the turboprop seems to have lost out to the jet.

While there is no argument about the passenger attraction of the jet, the economics of the turboprop are superior to those of the pure jet over sectors of under about 500 miles. Yet it is an undeniable fact that if a passenger prefers the jet under conditions of equal fares, the turboprop will operate empty—and in that event

good economics will not matter. Nevertheless, many operations experts, particularly turbopropagandists, are fearful of the complications that the jet will bring to air traffic control on shorthaul routes.

However, interest in the smaller jets proposed by Boeing and Douglas the 717 and the DC-9—has not been particularly great, but financial reasons are partly responsible for this. There is no question that many turbine-aircraft orders are being delayed because of lack of finance. And quite a few may be cancelled because of financial problems. Nonetheless, these financial problems have got to be solved, for the operator without advanced turbine transports in the 1960s will be doomed.





EXTREMELY FUNCTIONAL cockpit of the Lockheed Electra is shown in the two photos above. The pilot has 30° unobstructed range or vision of either side of his forward line of sight. The standard Electra cockpit is designed for a three-man crew plus an observer.

Study forecasts 670% jump in air cargo by 1965

by Donald Frederick

"SELL AIRFREIGHT" is the battle cry of a recent air cargo study. Furthermore, the study anticipates that it will be sold and predicts an increase of 670% in air cargo movement by 1965.

In 1961, there will be some 1.1 billion ton-miles of air cargo (meaning airfreight and express), and by 1965 growth will spiral to 2.7 billion ton-miles.

These predictions stem from a study prepared for Boeing Airplane Co.'s Transport Division by Stanley H. Brewer, transportation professor at the University of Washington.

The report found that actual airfreight and express movements totaled some 400 million ton-miles in 1956. Preliminary figures for the first six months of 1957 indicate this traffic 30% above last year. If this growth rate continues, the 1965 total will make the Brewer estimate look conservative.

Brewer based his forecast on the assumption that air cargo movements will be drawn from small-shipment freight traveling more than 400 miles at surface rates, which now exceed six cents per ton-mile.

Past growth cited

The Boeing sponsored study, entitled Air Cargo—the Next 10 Years, covers some 120 pages, and devotes considerable space to the historical development of air cargo and the factors that affected its growth. The report also includes an analysis of traffic and rates of motor carriers and rail freight forwarders, where Brewer foresees the first large areas of airfreight penetration.

The forecast does not consider the possibility of air cargo expansion through shipment of parcel post by air or shipment of freight now being moved in carload lots.

Optimism did not entirely dominate the Brewer study. Analysis of present conditions revealed that, air cargo movement was not being exploited adequately. In Brewer's opinion, airline investment in better airport facilities would go far toward reducing present expensive handling costs. The problem here, he says, is airline reluctance to invest large sums of capital in such facilities as long as there is the pressing need to channel available funds into new aircraft, "and as long as there is some uncertainty as to whether such facilities can be capitalized by the operating companies."

Brewer blamed carriers for the attitude of some shippers that airfreight is a luxury. According to Brewer, airlines convey this notion to shippers and the speed of airfreight furthers the illusion. Thus the traffic manager often thinks of airfreight only as an emergency measure.

Even with these handicaps, the Brewer study noted a healthy growth pattern in the past. Statistical data revealed a yearly growth rate of 21.2% excluding 1951-54, when most available cargo aircraft were involved in the Korean airlift.

Looking at surface rates, Brewer took cognizance of the 5% increase on small shipments the past year, with a further 20% increase expected as a result of proceedings now under way at Interstate Commerce Commission (Ex Parte 206).

In contrast, he predicts a lowering of airfreight rates. This is to be accomplished through expansion of deferred airfreight rates and an extension of volume discounts. Lower rates plus increased capacity in aircraft of the future should result in a growth rate equal to that of the past.

The report suggests that aircraft of the future will effect a major revolution in air cargo, citing three key factors:

The airplane is the only method of transportation that has not reached maximum limits of size and carrying capacity.

The world has never had enough transportation facilities.

The real potential of the airplane in the U.S. is only now being realized.

Brewer contends the modern cargo plane will enable operators to reduce rates further through greater payloads at reduced direct operating costs per ton-mile and through greater efficiency in loading and unloading. Operators of these craft, he predicts, will attract substantial quantities of airfreight.

TWA reveals details of Idlewild terminal

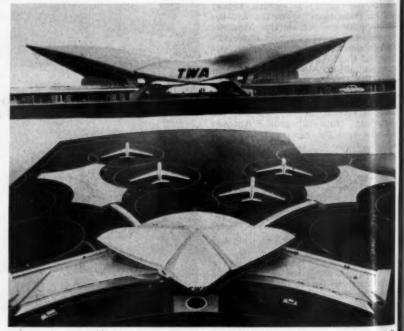
Trans World Airlines will begin construction of its terminal building at New York International Airport (Idlewild) in April and the first phase, including partial use of the right wing for temporary facilities, is expected to be completed in May or June 1959. The complete structure will be in use by 1960.

The building will be located opposite the parkway entrance to Idlewild, to the left of the International Arrivals building. It will incorporate "every convenience for the air traveler

of today and tomorrow," acording to the architects, Eero Saarinen & Associates.

Service shops will ring the perimeter, a carpeted seating area will be located in the center below the surrounding floor level providing a view of aircraft landing and taking off. A restaurant, coffee shop, bar and meeting room will occupy separate areas.

Passengers will go to and from flights on moving sidewalks along the length of the tubular glass-topped "fingers" leading to boarding areas.



ARTIST'S CONCEPT of TWA's Idlewild terminal building. It is a concrete shell structure of four interacting vaults which form a huge umbrella over all passenger areas.



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Today many excellent local airlines serve our nation-and most of them connect with the coast-to-coast routes of United Air Lines. So no matter where you live, it's just a short trip to one of the gateway cities on the Main Line Airway, with its swift DC-7 nonstops and famous Red Carpet* Service. Or-if your city is one of the eighty served by Mainliners®, United will arrange for your connecting travel on any of the local airlines-United's good friends and neighbors.

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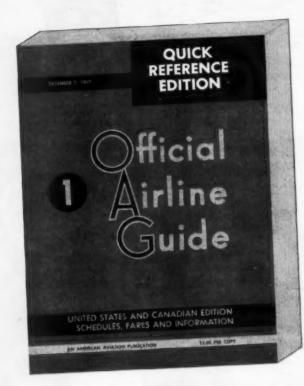
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NOV

Keeping right adds to runway life



TULSA MUNICIPAL AIRPORT officials have painted yellow stripes down the middle of each half of the 150-ft. wide east-west runway to assist pilots taxiing to and from terminal areas to stay off the center line of the runway. This will add to the runway's life by allowing more takeoffs and landings before pavement cracks. Pilots are requested by tower to keep nose wheel on yellow line.

Sabre metal products offers big airport sweeper

Sabre Metal Products, Inc., has unveiled the "Jet Electro Vacuum Magnetic Sweeper" which it claims is the world's largest airport sweeper designed especially for the jet age.

The sweeper combines sweeping, electromagnetic, jet agitation and vacuum cleaning actions to clear runways, taxi strips and ramp areas of all types of debris which could cause serious damage to jet engines.

In a demonstration recently at Chicago Midway Airport, the cleaner picked up metal objects, gravel, pebbles and other trash accumulated on the paved areas.

The jet agitator, located in front of a vacuum nozzle, stirs up the debris with a wind velocity of 150 mph, enabling the powerful vacuum to sweep up ferrous and nonferrous objects. The velocity of the vacuum delivers 72 million cu. ft. of air every 24 hours.

The self-propelled unit is mounted on a truck chassis and controlled from a conventional cab. Cleaning swath is from 8 to 12 ft. and the unit is capable of sweeping up to 1.8 million sq. ft. an hour at speeds of 5 to 35 mph.
Other specifications of the cleaner:

Length 43 ft.; width 8½ ft.; height 13 ft.; cleaning swath 12 ft.; turning radius 41 ft.; outside speed 50 mph.

Sabre has built some 300 airport magnetic sweepers, according to President E. A. Yucis. The new sweeper was designed and engineered in compliance with military and Civil Aeronautics Administration requirements.

U.S.C. to conduct aviation institute

Aviation Safety Division of the University of Southern California, Los Angeles, will sponsor a two-week in-stitute for commercial and business aircraft operators starting Jan. 20.

Course is designed primarily for operations managers, senior pilots, flight engineers, flight and ground in-structors, test pilots and executives. Lectures and discussions will cover four areas of aviation: aeronautical engineering, aviation physiology, aviation psychology and accident prevention.

"We Go to Bat for Better Aircraft Maintenance"

There's nothing more important to flight safety than good maintenance.

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San Francisco, Calif. Teterboro, N. J.



TION

Summary of Domestic airline traffic for 9 mos. ended September 30, 1957 vs. 9 mos. ended September 30, 1956

Compiled by American Aviation Publications from Official C.A.B. Data

*	Reve	nue Passen	igers		nue Passen (In Thousa		Total To	n-Miles Rev.	Traffic To	n-Miles	E Us
Airlines	1957	. 1956	Change	1957	1956	Change	1957	1956	% Change	1957	19
				D	OMESTIC						
American Braniff Capital Continental Delta Eastern National Northeast Northwest TWA United Western	4,688,049 1,490,179 2,936,000 616,682 1,990,481 5,878,710 893,489 565,611 1,035,805 3,418,996 4,722,772 1,024,475	5,791,025 1,331,026 2,180,333 523,947 1,761,451 5,572,639 1,038,765 462,875 1,008,160 3,089,535 4,725,034 624,726	19.1 12.1 34.7 17.7 13.0 5.514.1 22.2 2.7 10.70.1 64.1	3,862,304 645,583 1,118,818 265,246 994,190 3,362,767 691,471 157,480 722,845 2,779,234 3,553,188 516,058	3,621,514 530,816 731,989 192,202 840,714 2,889,953 739,306 92,844 671,339 2,441,839 3,273,012 311,500	6.6 21.6 52.8 38.0 18.3 16.4 -6.5 69.6 7.7 13.8 8.6 65.7	454,636,423 69,012,483 115,700,648 27,700,567 106,525,979 348,393,039 73,688,694 15,894,974 81,574,723 300,514,494 409,138,180 54,455,032	422,015,995 56,791,857 76,588,640 20,220,792 91,039,134 81,9035,749 82,091,641 8,945,401 77,047,838 265,765,508 380,324,434 36,689,431	7.7 21.5 51.1 37.1 17.0 9.2 -10.2 77.7 5.9 13.1 7.6 48.4	59.0 47.7 47.5 46.1 55.6 45.8 52.3 42.9 51.6 57.7 64.8 57.7	6 5 4 5 4 6 5 6 5 6 6 6 6 6
TOTALS	29,261,249	28,109,516	4.1 1	8,669,184	16,337,030	14.3	2,057,235,236	1,836,556,420	12.0	54.8	5
				INTE	RNATIONAL						
american Branifi Delta Eastern Vational Vorthwest Hawaiian Panagra	169,205 32,497 52,032 243,830 50,207 91,994 10,930 106,397	105,002 24,315 44,290 189,529 86,800 87,130 10,681 107,772	4.0 33.7 17.5 28.7 -42.2 5.6 2.3 -1.3	81,146 68,625 61,234 324,515 40,668 201,131 29,382 133,487	75,540 52,183 48,974 256,125 49,312 178,309 26,940 126,883	7.4 31.5 25.0 26.7 -17.5 12.8 9.1 5.2	11,441,937 8,360,571 7,349,467 35,040,378 8,837,070 35,811,736 3,331,904 18,070,282	10,358,871 6,748,963 5,527,915 28,669,081 5,428,540 34,739,402 3,131,903 16,888,296	10.5 23.9 33.1 22.2 62.8 3.1 6.4 7.1	67.7 51.6 55.4 59.8 59.9 67.9 56.8 59.8	6 5 4 5 5 5 7 6 5
Lat. America Atlantic acific DX/SEA-HON Alaska WA nited 'estern	957,030 849,002 216,829 15,930 59,545 196,506 80,453 3,659	931,533 782,653 222,506 14,942 59,294 216,037 79,747	2.7 8.5 -2.6 6.6 0.4 -9.1 0.9	967,811 1,144,631 836,555 46,162 65,256 566,676 200,717 5,690	853,921 975,826 649,409 40,363 72,339 560,761 198,190	15.7 17.3 28.8 14.4 9.8 1.1 1.3	132,598,294 148,922,624 106,846,851 5,061,409 9,150,840 72,686,938 21,986,186 626,869	112,698,785 127,200,818 88,922,153 4,216,966 10,959,073 72,350,684 21,804,823	17.7 17.1 22.4 20.5 —16.5 0.5 0.8	72.4 62.6 68.4 49.4 50.9 66.9 63.9 49.7	6 6 6 6
TOTALS	3,049,186	2,936,608	3.8	4,718,142	4,097,772	15.1	619,730,043	542,303,406	14.3	65.6	-
				LOCA	AL SERVICE						
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TOTALS	2,870,031	2,604,131	39.0	558,724	481,926	15.9	57,203,496	49,154,413	16.4	47.0	4
aribair awailan rans-Pac.	174,709 324,910 108,542	139,319 334,611 165,336	25.4 —2.9 —34.4	12,461 49,456 17,533	10,286 47,216 20,892	21,2 4.7 —16.1	1,350,819 5,248,905 1,425,087	984,505 5,175,780 1,697,417	1.4	59.9 57.6 58.2	5 5
				HELICOP	TER SERVIC	ES					
ni. Helicopter as Angeles Airways aw York Airways	36,744 24,537 52,903	14,513 29,865	69.1 77.1	553 872 993	552 560	57.9 73.8	74,400 134,406 121,789	21,954 101,942 76,518	31.8	32.3 50.1 42.6	4: 5: 6:

CONTRACTS

Department of Commerce has announced the following contracts:

The Garrett Corp., Airesearch Manufacturing Co. of Phoenix, two contracts—\$4,751,594 for spare parts for gas turbine compressors and \$4,247,145 for gas turbine compressors.

Sundstrand Machine Tool Co., \$1,235,-transmission assembly for F-100D aircraft.
The General Tire & Rubber Co., \$1,-043,792, main wheels and brakes for F-100D

aircraft.
Lockheed Aircraft Corp., \$1,228,595, pro-totype ferry range extension system for F-104A aircraft.

P-104A aircraft.
Canadian Commercial Corp., \$2,087,000,
DHC-4 airplanes.
Lockheed Aircraft Overseas, Inc., \$1,721,251, parts, components, material, data
and services to support assembly of T-33A
aircraft at Kawasaki Aircraft, Japan.

Solar Aircraft Co., \$4,448,025, gas turbine generator sets type MA-1 burner assemblies for KC-97 type aircraft.

Systems Development Corp., \$4,385,446. product improvement of the universal and simplified camera control system.

Bendix Products Division, \$1.171,859, main wheel and brake assemblies for KC-135 aircraft: \$1,586,111, main wheel and brake assemblies for B-52D aircraft.

General Precision Laboratory, Inc., \$1,-678,460, radar set components.

678,460, radar set components.
Flight Enterprises, Inc., \$2,395,332, progressive aircraft reconditioning cycle and modification of C-118 type aircraft under the MATS-SAM concept.
Continental Motors Corp., \$2,050,509, production of Packett engines.
Thompson Products, Inc., \$2,049,630, overhaul of turbo-aiternator drive.
Lockheed Aircraft Corp., \$1,536,253, manufacture and prototype installation of electronic equipment kits in one RC-121D aircraft.

California Stamping & Manufacturing Co., \$1,004.756, weld assemblies.

FACILITIES

Temco Aircraft Corp. will complete it \$59,000 antenna laboratory building this month at Gariand. Tex.

Janitrol Aircraft-Automotive Div., Surface Combustion Corp., is building a plant for manufacturing, engineering, research and testing in Columbus, Ohio. Completion of the \$2-million project is alated for the appring. spring

spring.

Haydu Electronic Products, Inc. is adding 15,000 sq. ft. at its Plainfield, N. J. plant. Expansion is to keep pace with even increasing demands in the electronics and aircraft industries.

Holex, Inc. is a new firm in the field of explosive ordnance and related devices. Company is located on 28-acre site in Hollister, Calif.

Electronic Specialty Co. has purchased the Cado Div. of Electromation, Inc., for an undisclosed number of shares of ESC stock. The purchased firm will become a part of ESC's Radiating Systems Div.

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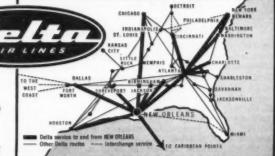
NOVE



Step out in New Orleans...via Delta

While Delta's New Orleans service does not provide for Bourbon Street arrivals and departures, this illustration does dramatize the quality of nearness that Delta provides. Radar-equipped DC-7's and DC-7B's fan out from New Orleans in virtually every direction. As new DC-7B's continue to join Delta's fleet, service along these and other major routes will constantly improve and increase.

General Offices: Atlanta Airport, Atlanta, Ga. Serving 60 cities in the U.S.A. and Caribbean



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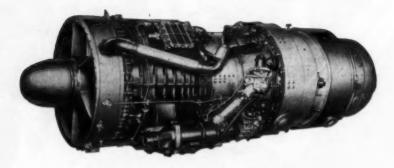


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INTERNATIONAL AVIATION

ICAO compiles dollar figures on world's airlines

by Anthony Vandyke

HOW DO financial results of airlines in different parts of the world stack up? Until the International Civil Aviation Organization started studying the answer to this question, comparative data of a financial nature was hard to come by. Differing rates of exchange, tax regulations and bookkeeping meth-ods discouraged the student of international aviation from delving into this

extremely interesting field.

ICAO, however, has for several years been collating data on the finances of the world's airlines and recently came up with complete information on the finances of 56 airlines in 28 countries for the year 1955. The statistics have been published by ICAO under the title "Financial Data 1955" (Digest of Statistics No. 62) at the price of \$1.25 (Canadian). Although lacking data from many of the world's small airlines, the ICAO study contains sufficient information to rank as a must for any student of commercial aviation.

By using dollars and cents as the common denominator, the ICAO sta-tistics make easy and fascinating reading. The information is at times startling. We learn, for instance, that the 1955 Aerolineas Argentinas' net loss was a whooping \$8,040,000, while Air France received no less than \$9,-748,000 in direct subsidies. Other carriers listed by ICAO as getting direct subsidies of more than \$1 million in 1955; Panair do Brasil, \$4,631,000; PLUNA (Uruguay), \$1,280,000; Aerovias Brasil, \$1,150,000; and PAA, \$1,039,000.

ICAO's data on operating expenses and revenues shows wide difference in various parts of the world. In terms of operating revenues per metric tonkilometer performed, Panair do Brasil did better than any of the other car-riers listed, with 127.5 cents. At the bottom of the list was Spain's Aviacion y Comercio which got only 11:1 cents. Second from the bottom was

Riddle Airlines with 17.1 cents. By comparison American Airlines got 34.3 cents and PAA 41.7 cents, while the figures for two big European carriers, KLM and SAS, were 44.2 and 51.0 cents respectively.

In terms of available capacity, the

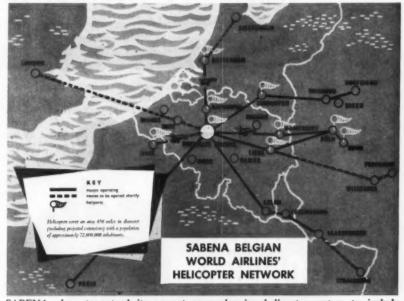
picture is very different. Brazil's Cruzeiro do Sul had the highest operating revenue for metric ton-kilometer available—69.6 cents. Aviacion y Comercio remained at the bottom of the list with 11.7 cents, with Riddle next at 14.9 cents. American was 20.8; PAA, 26.6; KLM, 25.8; and SAS, 27.6 cents.

Panair do Brasil topped the list for operating expenses—it spent 147.7 cents per metric ton-kilometer per-formed. At the bottom of the list was Riddle with 14.0 cents. Comparative

figures for American, PAA, KLM and SAS were 29.1, 39.8, 40.5 and 48.1 cents respectively.

In the category of operating expenses per metric ton-kilometer available, Panair do Brasil was once again top with 69.6 cents while Aerovias Sud Americana was down at the bottom with 11.7 cents, just a shade below Riddle's 12.2 cents. American was 17.7; PAA, 25.4; KLM, 23.7, and SAS, 26.1.

The ICAO statistics show American to be the No. 1 airline in terms of current assets-\$115,900,000while United ranked highest in current liabilities-\$48,300,000. The carrier with the greatest long-term debt in 1955 was Air France with \$94,294,000. Largest landowner was Brazil's VARIG with \$4,093,000 valuation listed.



SABENA plans to extend its present comprehensive helicopter system to include London, Amsterdam, Wiesbaden, Frankfurt, and Strasbourg.

BRIEFS

Pacific Western Airlines Ltd. has asked the Canadian Air Transport Board asked the Canadian Air Transport Board for a new route segment between Vancouver, B.C., and Windsor, Ont., with two daily roundtrip schedules via Edmonton, Prince Albert and Winnipeg, Three Comet 4B aircraft would be purchased to provide the new service. . . . Qantas Empire Airways has granted flight pay

increases, separate from basic salaries, to its pilots and flight navigators, following acceptance of its wage proposal by the Australian Airline Pilots Assn. Increases range up to £200 (\$450) annually for pilots and up to £100 (\$225) a year for flight navigators and are retroactive to April 1957 . . . Deutsche Flug-dienst, Frankfurt-based affiliate of Lufthansa, has bought five Convair 240s from KLM. Lufthansa owns 25% of the capital of the independent operator.

The MiG-17 jet fighter is currently in production in three Communist countries-the Soviet Union, Czechoslovakia and China. Czechoslovakia also is building the more modern MiG-19. In China, MiG-17 production is expected to reach its peak at the end of this year or the beginning of 1958. The Polish Air Force is currently reequipping from MiG-15s to MiG-17s. . . . India is likely to order a batch of Hawker Hunters for its air

TION

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Los Angeles to New York

Lv. (PST) 8:30 am, 8:30 pm-only 7 hrs., 15 mins.

AMERICAN AIRLINES

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AMERICAN AVIATION

TRANSPORT TRENDS

- The CAB staff's tentative position in the General Passenger Fare Investigation will be:

 No changes in the general level of airline fares should be permitted at this time. When the staff presents its case it will also argue in favor of measuring earnings on the returnon-investment yardstick. This is in opposition to airline arguments for adoption of an "operating ratio" technique. Precise return recommended by the staff: 8.9% for the Big Four, 9.5% for regional trunks. Traditional rate has been 8%.
- Apart from the fare case, but emphasizing a unique problem, is Continental Air Lines' proposal to boost fares 7% on its non-competitive route segments operated with DC-3s. Reason: CAL's annual loss on these segments is about \$1.5 million. Routes are largely those acquired from Pioneer Air Lines, but CAL voluntarily gave up claims to subsidy for the loss operations last April. While its other services produce a "modest profit," CAL wants to minimize the drain caused by the DC-3 routes by upping fares slightly instead of requesting subsidy.
- CAB's initial reaction to Capital Airlines' request for subsidy (see page 29) will be to refuse any "temporary" or "interim" subsidy until a formal investigation. This could last at least a year. If subsidy were granted, it would be retroactive to Capital's filing date (Nov. 6). American Airlines, meanwhile, has asked to intervene. AA will question whether it's in the public interest to subsidize one carrier operating in competition with non-subsidized lines.
- If CAB okays TWA's use of sleeperette seats on transcontinental nonstops, competition may force other carriers to offer the same service to first-class passengers. At least one other major trunk is preparing to get sleeperette seats, just in case.
- James R. Durfee is expected to be re-designated CAB Chairman by President Eisenhower at the end of the year. Chan Gurney probably will get another term as Vice Chairman, but it isn't certain yet. No memberships are at stake this year.
- There's little chance now for quick settlement of CAB's Investigation of Howard Hughes' holdings in Floyd Odlum's Atlas Corp. A proposed settlement, signed in September by Hughes' counsel and the CAB staff, has been rejected by Examiner Paul N. Pfeiffer. New hearings may be called in early December. Hughes will be forced to appear.
- The House subcommittee that's investigating government regulatory agencies has publicly accused CAB of delaying its probe by refusing access to pertinent files. But now there's evidence that the group, headed by Rep. Morgan Moulder (D.-Mo.), has been dragging its own feet. On Oct. 18, CAB asked the subcommittee for proof that its investigators had been cleared to look at classified documents in the agency's files. By Nov. 12, there was no answer and CAB repeated the request. Whether the subcommittee hadn't obtained the clearances or just hadn't gotten around to CAB's request couldn't be determined immediately.
- Number of no-shows on domestic airlines is reported to have dropped 49% in last 14 months. Reason: Air Traffic Conference's three-part no-show control plan (time limits on ticket pickup, reconfirmation and recently-established no-show penalty). At the same time, late cancellations have jumped 56% on coach and 29% on first-class, as passengers cancel to avoid the penalty. About 26% of space freed by these cancellations was resold.
- Watch for release soon of Senate Permanent Investigating Subcommittee report on CAB New York-Florida "leak" case. Staffers have wrapped up recommendations and are seeking senators' approval. Sen. John McClellan (D.-Ark.), who heads the full committee, reportedly has promised to back subcommittee chairman Henry Jackson's proposed legislation aimed at plugging leaks in government agencies.

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INDUSTRY

Aviation has supplanted automobile industry as bellwether of American business, says Janeway

The economic, political and military competition between the U.S. and Russia has made the "aeronautics industry," rather than the automobile industry, the key to the overall U.S. business trend, according to an article by Eliot Janeway in the Harvard Business Review.

Included with aeronautics are the related electronics, instrumentation, atomics and missiles industries, he said. Janeway is head of Janeway Publishing and Research Corp. and the author of the book, The Struggle for

Survival.

The key to this U.S.-Russian competition "is the concept of time—more
specifically the unprecedented long lead
times involved in the aeronautics investment cycle," he stated. During most
of the last 40 years, U.S. economy has
been geared to the automotive industry
whose full processing cycle was measured in months. Now aeronautics is
dominant, with lead times running into
years or even decades, he added.

One reason the Soviets "are so formidable today is that their mobilization on the basis of our technique of automobile production in the 1920s

gave them a head start in the race for aeronautic leadership in the 1950s. Thus, they managed to apply our technique of medium-term production to today's new long-term production. The reason they were able to do this and do it so many years ago . . . is that their thinking has all along been long-term thinking."

Summing up, Janeway said:
"Aeronautics (with its related industries) has become the largest single industrial source of demand for capi-

tal in the economy.

"The long lead time involved in the aeronautic investment process has altered the workings of the traditional business cycle by subjecting it to the workings of the defense cycle.

"The growth of aeronautics as the main investment force . . . parallels an even more dramatic trend-making growth in the Russian economy . . .

"Thanks to the workings of the aeronautical investment process, government spending and private corporate investment are now rising simultaneously. This is new."

He added: "It is not only the fact that Russia takes the long view—it is the effectiveness and, above all, the speed with which she is applying her long view to the air race that is sharpening the challenge of the Aeronautic Age to us, as Americans. And it is the competitive pressure of Russia's accomplishments which is lengthening our investment and production lead times, depriving us of the cyclical breathing spells we still expect, and multiplying our continuous requirements for money, for facilities, and especially for the skills to put them to work.

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"Managements which underestimate the lead times of the Aeronautics Age are the managements which will underestimate the work that money and skill must do during these lead times. These are the managements which will be squeezed and, as the saying goes, merged and submerged."

Chance Vought changes two office setups

Chance Vought Aircraft, Inc., has established a programs management department to include the program control office and other functions now in accounting and sales department. H. P. Sallada, former executive vice president, has been named senior vice president and will direct the new organization.

The contract administration office has been redesignated the legal office and H. E. Kay, with title changed from contract administrator to legal counsel, will continue to report to C. E. Burt, vice president and controller.

Douglas consolidates sales, testing activities

Douglas Aircraft Co. has consolidated all sales activities under the direction of Nat Paschall and all flight and testing activities under Arthur E. Raymond. The new alignments followed the election of Donald Douglas, Jr., as president of the company.

Paschall is vice president of sales and Raymond vice president-engineering. Douglas formerly directed the functions as vice president-military

sales.

Cessna announces new 175-hp lightplane

Cessna Aircraft Co. has announced a new single-engine aircraft, Model 175. The new plane will feature a 175-hp engine and fit into the Cessna line between the Model 180 and the Model 172.

The company reports that the "entirely new airplane" will be priced at about \$11,000, and first deliveries are expected to be made during March. The 175 is the fifth production model and the company has hinted that other models are "in the offing."

Sikorsky H-34 fitted with heavy armament



Sikorsky Aircraft has installed armament fittings for forty 2.75 rockets, two 5-in. anti-tank/anti-submarine rockets, two 20mm cannon, and three 50-cal. and six 30-cal. machineguns on this Army H-34. Copter now is undergoing tests at Ft. Benning, Ga.

Flight engineers' contract with Pan American may set pattern for other airline negotiations

The three-year pact signed late last month by Pan American World Airways and the Flight Engineers International Assn. most probably will be the pattern FEIA will work for in future negotiations with other major airlines. If this is true, it is an agreement that has three highly potent points, one of which is apt to be explosive in view of the tenseness now existing between FEIA and the AFL-CIO affiliated Air Line Pilots Assn.

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Of particular significance is the pay revision resulting from adoption of a formula new to airline flight crew pay patterns. The new contract, which lasts until June 1, 1960, is based on hourly pay that increases with length of service, a flat mileage pay provision and aircraft gross weight pay.

Of almost equal importance is a covenant that provides for pay increases of approximately 10% for flight engineers assigned to Pan Am's present piston engine planes, but sets a scale of about 20% more for those engineers who will serve on the airline's jet 707s and DC-8s. This means that senior engineers on DC-7s now in service will receive a minimum guarantee of \$1,010 a month, and those on jet Clippers will receive a monthly guarantee of \$1,210.

The third, and perhaps of most consequence, is the part of the agreement extending the pact into the middle of 1960—well into the jet age—and assuring the flight engineers that no pilot certificate will be required. The disagreement between FEIA and ALPA over the pilot certificate issue has resulted in heated, and sometimes bitter, differences and accusations. ALPA has claimed a flight crew member should also be able to pilot the aircraft in case of an emergency. FEIA counters that new jet equipment means fewer aircraft due to size and speed and that the pilots are only interested in making jobs for themselves when this becomes a reality.

This is a particularly important issue in the current negotiations between PEIA and Eastern Air Lines. The pilots are reportedly conducting their own "study courses" at a Coral Gables ground school to prepare for future CAA flight engineer tests. These tests are basically (1) a written examination; (2) an oral examination, and (3) a demonstration of skill and knowledge.

There are other requirements, but an airline pilot should ordinarily have little difficulty qualifying for his certificate and this is what makes FEIA wary of ALPA members encroaching on what they consider their domain. They contend that an A&E license, which practically all of their members have, should be a prerequisite and that the next assurance for safety is actual experience as a flight engineer.

Some airlines at this time require that flight engineers be pilot-engineers

and the engineers bitterly recall the United Air Lines strike of 1955. In this dispute, pilots took over the flight engineer duties and the walkout lasted 53 days. FEIA wants no more of this and in future negotiations they are going to fight to have it spelled out in new contracts that CAA Flight Engineer certificates be the major requirement for filling the third flight crew member position with no mention of pilot ratings.

This dispute between the two unions could conceivably rupture airline operations as new contracts come up, leaving the airlines concerned caught in a squeeze as an innocent third party. Eastern Air Lines may be the first real test, for FEIA has indicated it will fight down the line to keep pilots in their cockpits and it makes no bones about walking out if the fuss with ALPA plays any great part in current negotiations.

Allegheny negotiates for 11 TWA 202As

Allegheny Airlines is negotiating with TWA for purchase of the latter's 11 Martin 202As. If the deal is consummated, the local service line will dispose of some of its 15 DC-3s.

Allegheny plans a capital outlay of \$3 million to \$5 million over the next two years, president Leslie Barnes said. Money will be used for gradual replacement of the DC-3s, normal expansion of the system and making provision for the new routes for which it has applied.

Examiner sets hearing on military discounts

Public hearings on the question of whether the domestic airline industry will continue to grant a 10% discount to the military in fiscal 1959 will open in Washington in mid-January, according to CAB Examiner Edward T. Stodola.

Although a majority of airlines has expressed support for continuation of the discount, two major carriers—American and United—went on record this month in opposition. The two were among a group of six lines which dropped the discount Oct. 1, but since have reinstated it pending outcome of a formal CAB investigation.

Agreements providing for the discount are renewable on a fiscal-year basis. Thus, the CAB case is aimed at completion prior to June 30, 1958.

Capital asks to abandon two local services

Capital Airlines has asked CAB permission to abandon certain services in the Piedmont area in which the Board has just instituted a new local service proceeding.

Service would be dropped at Bristol / Johnson City / Kingsport and over the Norfolk-Knoxville route via Greensboro, Winston-Salem, Charlotte, Raleigh/Durham, Elizabeth City and Rocky Mount.

Capital also wishes to suspend service at Asheville, N. C., until the airport there can accommodate four-engine equipment. Capital claims the cities do not produce enough business for trunk operations.

Board proposes mail pay hike for Allegheny

Civil Aeronautics Board has proposed increased mail rates for Allegheny Airlines which would raise temporary annual mail pay for the carrier to \$2,537,018. Figure is equivalent to the carrier's reported breakeven need.

Under the Board's proposal. Allegheny would get \$546,418 additional back pay and approximately \$400,000 more on an annual basis beginning July 1, 1957. Additional back pay is \$250,000 less than requested by the carrier for the period April 1, 1955 through June 30, 1957.

CAA gets first of five Convair 440s



Civil Aeronautics Administration's Convair 440 (C-131E version), first of five such aircraft to go into operation with the Flight Inspection Division in its intermediate altitude facilities testing program. The Convairs will cost \$825,000 each, and will carry about \$70,000 worth of electronics equipment designed and built by FID and the Aeronautical Center at Oklahoma City. Weather radar will be installed at a cost of \$20,000, while the auxiliary power unit, designed by AiResearch Mfg. Co., Phoenix, Ariz., will account for an additional \$25,000.

NOVEMBER 18, 1957

Examiner recommends National, Capital for major routes in Great Lakes-Southeast case

National Airlines and Capital Airlines have been recommended for major new route awards by CAB Examiner William F. Cusick as CAB's biggest current domestic route case—the Great Lakes-Southeast Service Case—moved closer to completion.

Delta, Eastern, Northwest, TWA and United also would get new routes or route adjustments under Cusick's

proposal.

Major effect of the recommendations, if adopted by CAB, would be to have four airlines—Eastern, Delta, National and Capital—providing longhaul service between the Great Lakes region and Florida.

Eastern and Delta, now serving Chicago and Miami, would be joined by National under Cusick's proposal. New NAL route would be Chicago-Miami via Indianapolis, Louisville, Knoxville, Atlanta, Tallahassee and Tampa/St. Petersburg/Clearwater.

Capital, through extensions of its Route 51, would be certificated between Buffalo and Miami via Erie, Cleveland, Akron/Canton, Youngstown, present intermediates to Atlanta, and beyond to Jacksonville, Tampa/St. Petersburg/Clearwater and West Palm Beach.

Delta would be authorized to operate Detroit-Miami service through an extension of its present routes north to Detroit from Cincinnati via Dayton, Columbus and Toledo. Cusick also would add Tampa/St. Petersburg/-Clearwater and Orlando as intermediates between Jacksonville and Miami on DAL's present route.

Eastern would get an extension of its Route 6 from Charleston, W. Va., to Chicago via Cincinnati, and an extension of its Route 10 from Louis-ville to Detroit via Cincinnati and Fort

Wayne.

United and TWA would be permitted to operate turnaround services between Chicago and Washington through a proposed lifting of present restrictions. United also would be authorized to serve Dayton and Columbus between Chicago and Washington.

Northwest's Route 3 certificate would be amended to authorize unrestricted operations between Detroit, Cleveland, Pittsburgh and the coterminals Washington/Baltimore.

In addition to the above proposals, a final CAB decision in the case will embrace the deferred proceeding in which St. Louis-Florida route issues are being considered. Next step is oral argument, probably in January, and a press release decision could be rendered by February.

Corp., which holds U.S. and Canadian rights to Decca. A Bendix affiliate, Computing Devices of Canada, Ltd., contributed some financial support.

Trials in 100 marine vehicles are expected and will include some Canadian government ships. Canadian commercial aviation interests apparently are not interested in participating in the trials.

The Canadian military, however, will operate a C-119 aircraft fitted with Decca and Doppler navigation systems in connection with a classified project. Canadian Royal Navy will try Decca

for air-sea rescue work.

According to an industry source, the U.S. Department of Agriculture is seeking trials of a portable field Decca chain for crop spraying operations. Also, the Airways Modernization Board is said to "look favorably" on Decca trials for helicopters in the New York City area.

Douglas, P&W start employment cutbacks

Douglas Aircraft Co. will lay off 1,200 employes at its El Segundo division and Pratt & Whitney Aircraft will lay off about 2,000 before Jan. 1.

The Douglas layoffs started Nov. 8 and will include 1,000 shop workers and 200 office and clerical personnel.

Pratt & Whitney is terminating 600 employes immediately—300 in East Hartford, 150 in Southington and 150 in North Haven. Cutbacks in production of military aircraft using P&W engines was cited as cause of the payroll reduction.

Canada completes fourth Decca chain

Final chain of four new Canadian Decca navigation chains was opened this month at Quebec. Opened previously were the Nova Scotia, Newfoundland-East and -West chains.

At official opening ceremonies coinciding with the annual meeting of the Air Industries and Transport Assn. of Canada, John Baldwin, deputy minister of transport, said primary purpose of the installations is to "assess interest of marine and aviation users."

Decca coverage in Canada now extends over more than a million square miles. Ministry of Transport is asking for extensive trials and expects to query users in about a year on their opinion of Decca's utility.

Cost of the chains is estimated at \$3 million and was paid for by Decca Navigator Co. Ltd. of England and the Pacific Division, Bendix Aviation

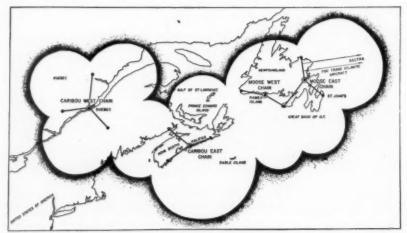
Study predicts big gain for KLM by 1962

A net profit of \$6.4 million for KLM Royal Dutch Airlines is predicted for 1957 in a study and appraisal of the airline made by Selig Altschul, Aviation Advisory Service, New York.

The study, an independent report made for the airline, also predicts major gains for KLM in the next five years. "Our projections indicate total gross revenues of more than \$5 billion for the world's airlines in 1962," the report says. "KLM, under such circumstances, may be expected to develop at least some \$177 million of this total, an increase of 56% over KLM's 1956 revenues."

New 880 sales managers

Convair has created separate managerships for export and domestic sales of the 880 jet transport. Alan W. Abels becomes manager of export sales and C. Gordon Wolcott manager of domestic sales. Wolcott will be responsible for planning and directing commercial sales in the U.S. and Canada. Abels will cover all other areas of the world.



DECCA chains in Canada cover more than a million square miles of sea and land.

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ECONOMY IS A WEAPON—National defense must fit the national pocketbook. Now, more than ever before, each element must be weighed against its cost. Northrop Aircraft's budget-minded management is continuing to use technology to achieve low-cost solutions to defense problems. This program brings results in weapons like the Snark SM-62, America's first intercontinental guided missile, the Scorpion F-89 all-weather interceptor series, the Radioplane Division's low-cost target drone and missile systems, and the Anaheim Division's ground-handline equipment, missiles and ordnance products. Latest example of this forward thinking's Northrop's new supersonic T-38 jet trainer airplane, a lightweight, economical member of an entirely new family of military aircraft which reverses the trend of rising costs. The T-38 can save hundreds of millions of tax dollars, and help provide the free world with the weapons of powerful military strength and vigorous economic solvency.

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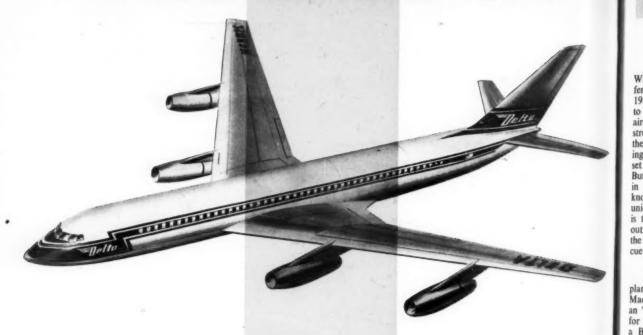
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for Delta's new Convair 880's...



Flight Control System_by Sperry

When Convair's new 880 jet airliners go into scheduled service for Delta Air Lines in 1960, they will be equipped with Sperry's new SP-30 electronic flight control system.

Developed especially for multi-jet and turbo-prop aircraft, the advanced SP-30 system provides smooth, accurate control over the full range of jet speeds and altitudes.

Passenger comfort and safety will reach new levels, with the SP-30 system supplying tight and fast-acting control of the 880 in all flight modes. And a companion compass system insures on-course navigation anywhere in the world, even over remote polar areas.

Equally important in Delta's view, the SP-30 features redundant circuits, transistors and magnetic amplifiers of "plug-in" design which spell maximum reliability and fast, easy maintenance.



SPENCER KELLOGG II. Assistant Chief **Engineer of Aeronautical Equipment** Division. A 20-year Sperry veteran, he has made important contributions in all phases of instrument and control engineering. He pilots both fixed-wing aircraft and helicopters.

Today, Sperry continues as the nation's largest producer of automatic flight control systems for multi-jet aircraft. In addition, thousands of other Sperry systems are at work in aircraft of all types-from business planes and helicopters to attack bombers. transports and airships.

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This record underlines once again the fact that when it comes to automatic flight control problems, Sperry engineers can meet the diversified demands of the industry. Write our Aeronautical Equipment Division for more information.

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WEST COAST TALK

by Fred S. Hunter

Unions changing attitudes as result of layoffs; may take cue from auto workers' negotiations

WHAT'S TO BE the effect of the Defense Department's financial woes on 1958 union contract negotiations soon to come up in the Southern California aircraft industry? Before cutbacks, stretchouts and ceiling payments rocked the industry on its heels, general feeling was that the unions were getting set to give the companies a hard time. But now the negotiation will take place in a stage-setting of layoffs. So who knows? One possibility—the aircraft unions may decide their best strategy is to mark time, let negotiations drag out until Walter Reuther closes with the automotive industry and take their cue from the terms reached in Detroit.

What's this we hear about Convair planning to go North American's Mach-Busters one better by formulating an "M-2" Club with two divisions; one for those who break past Mach 2 in a B-58 and the other for those who do it in an F-106A? The Mach 2 capabilities of the B-58 have been widely exploited by the Air Force, but little has been said about the performance of the F-106A in the higher ranges. It's said to have a speed of Mach 2.04.

Pan American is fancying up its staff house at Frobisher, Baffin Island—an 8,900-sq.-ft. structure with 25 sleeping rooms, lounge, recreation room, dining room and kitchen—with attractive color schemes inside and out to relieve the drabness of the area, and make things look brighter for the crews when they lay over. The building, says Pan Am, will be the most luxurious in Frobisher. It has five oil-heating furnaces to keep everybody warm. It will be ready in mid-December.

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Some of you, no doubt, will recall the story of Frank Vosepka and the green stamps for DC-6Bs. This is to report that Western Air Lines' chief inspector and chief practical joker has lost none of his touch. As everyone who is aware of the intensity of the competition between the jet transport manufacturers understands, the DC-8 development area at Santa Monica is high on the company's security list. So the other day Frank dug up an old Conveir plant badge left over from 1948 when he was working on the delivery of 240s to WAL. Then he stopped at a drug store and bought two rolls of miniature-camera film. Ar-

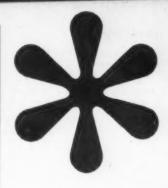
riving at Douglas, he maneuvered his way into the DC-8 area and left the badge and the film as though they had been dropped accidentally. Then he walked quietly away and waited for the "explosion!"

North American's Model 246 jet utility transport, originally scheduled to fly in the spring, is down on the calendar for June, but may be set back to August by revised delivery dates on the J85 engines, which General Electric is beefing up. Fairchild is making a strong pitch to get on the Model 246 with its J83 engines, but so far NAA is sticking to the J85. The manufacturer is partial to the GE engine because of its long association with GE on the J47 engines in its F-86 series.

Also rescheduled because of the J85 developments is Northrop Aircraft's TZ (T-38) basic jet trainer for the Air Force. The T-38 and the N-156F fighter version designed to meet NATO requirements are to be powered by two J85s equipped with afterburners to provide thrust for maximum speeds in the area of Mach 1.2 to Mach 1.5. Northrop also is making some design changes in the tail as a result of windtunnel tests.

William P. Lear, Lear, Inc.'s energetic chairman, has an unfailing flair for the dramatic. He was booked recently for a speech before the Los Angeles section of the American Institute of Electrical Engineers on "Progress of Electronics in the Soviet Union." Then came "Sputnik." Lear promptly changed the title to "How Come the Soviet Union Got There First with the Earth Satellite and the Intercontinental Ballistic Missile." It was a good talk.

Inflight service people have already discovered that meal trays for the new jets can't be any bigger than those used on current DC-7s and Super Constellations . . . Example of how new route awards make more airline jobs—Bonanza will hire approximately 25 new pilots to cover its new Phoenix₂Salt Lake City segment . . . Nan McCandless, librarian at Douglas-El Segundo, has compiled an "Index to Abbreviations and Acronyms" which is going to be a valuable tool for Ed Heinemann's engineering staff.



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Technical reports

"Improvements to DME Interrogaand Development of Accessories. (CAA Technical Development Report No. 296.) W. E. Haworth, CAA Tech-nical Development Center. Jan. 1957. 16 pages. 50 cents. (Order PB 121880 from

OTS.)

Advances in design during the past few years have resulted in lightweight, accurate and relatively economical DME interrogators. This report reviews develop-ment of the Models DIB, DIC and DID, most significant of the modified devices, which weigh about half as much as earlier units, use half the number of tubes and are considerably more reliable.

"Evaluation of the Resetting Con-tinuous Fire-Detection System for the B-36 Aircraft Nacelle." (CAA Technical Development Report No. 295.) L. E. Tarbell, CAA Technical Development Tarbell, CAA Technical Development Center. Nov. 1956. 17 pages. 50 cents. (Order PB 121777 from OTS.)

Flight and fire-in-flight tests which led to the recommendation of a continuous type of fire detection system for the B-36 nacelle are described.

'Automatic Flare-Out for Landing." D. Markusen, R. McLane, and O. Pomeroy, Minneapolis-Honeywell Regulator Co. for WADC. Mar. 1956. 146 pages. \$3.75. (Order PB 121383 from OTS.)

Results of this research confirmed feasibility of automatic flare-out control for all-weather operations of military

aircraft.

"Survey of Low-Alloy Aircraft Steels"-Treated to High-Strength Levels." Heat-Treated Part 1: Hydrogen Embrittlement. G. Sachs and W. Beck, Syracuse Univ. for WADC. June 1954. 96 pages. \$2.50. (Order PB 121700 from OTS.)

This report describes and discusses phenomena resulting from hydrogen retained by steel until it is subjected to laboratory and field tests and is put into

"Cumulative Fatigue Damage of Aircraft Structural Materials." Part 2: 2024 and 7075 Aluminum Alloy Addi-tional Data and Evaluation. A. M. Freudtional Data and Evaluation. A. M. Freudenthal and R. A. Heller, Columbia Univ. for WADC. Oct. 1956. 27 pages. 75 cents. (Order PB 121909 from OTS.)

Tests were conducted on 20 unnotched specimens of 2024 and 7075 aluminum alloy to determine the effect

on fatigue life of randomly varying stressamplitudes representing gust or maneuver load sequences encountered during flights.

"The Properties of Constructional Metals as a Function of Temperature and Strain Rate in Torsion." E. P. Klier and others, Syracuse Univ. for WADC. Nov. 1956, 201 pages, \$4, (Order PB 121912 from OTS.)

Torsion tests were conducted on cylindrical and tubular specimens of structural alloys to evaluate the reduction of the modulus of rupture that was observed in previous research to accompany

increasing strain rate.

"Chemical Resistance of Plastics." Navy Bureau of Ships. Mar. 1954. 475 pages. \$9. (Order PB 121133 from OTS.)

Laboratory tests were conducted on effects of chemical agents on plastics. This volume brings together the large amount of data gained from the experimentation.



SAM SAINT SAYS

Progress is Where You Find It ..

GOING INTO POSITION for takeoff at Idlewild, the Royal Coachman was lighter than usual, 119,852 pounds, only 67 cash customers plus the babies. We shovelled coal into the four big engines and started down the runway in the general direction of Los Angeles.

As it begins to roll, the beast is a heavy thing; you are conscious of those 60 tons. The airspeed climbed to 70 knots. The BMEP gauges (that measure the power actually delivered to the props) should have settled down, but they hadn't. One and two were jump-ing around. Number three was even worse.

Your mind works fast, plugs are fouled from standing too long; they'll clean themselves out in a moment. You are reasonably sure, but you can't be positive. The airspeed needle is wavering past 100 knots. The heavy, lumbering giant is changing swiftly to a sleek thing of power and beauty, ready to into its own element-ready except for those engines. They are not smoothing out as fast as they should. A quick look back at the engines on my side. There is visible roughness. Close the throttles.

We applied reverse thrust and brakes lightly. This was our way of telling the passengers there was plenty of runway left. No need to worry.

We taxied back to the runup pad to be in position for takeoff again. While the co-pilot ran up the engines in the manner prescribed to clean the faulty spark plugs, the engineer watched the performance of the spark plugs on a cathode ray tube in the cockpit-the engine analyzer.

I took the P.A. system mike in hand and explained to the passengers what was going on. I described the engine analyzer and told them we were not guessing what was going on in those rough engines, we were actually watching the faulty spark plug action that was causing it. One after another we could see those dormant plugs come alive and go to work. We were simply doing what the maintenance depart-ment would do if we turned the airplane back to them.

In a few more minutes we were off. Later on a walk through the cabin,

one gushing lady passenger said, "I'm so glad it happened. Now I have more confidence." Few passengers would have gone that far, but I'm sure most would have agreed it was relaxing to know what was going on and very fine indeed to know that the crew could look through the cowling and cylinder heads to see what the plugs were doing.

It set me to thinking about all the chunks of progress we take for granted. Progress is best measured by looking back along the road you have travelled

There was a day when we didn't have a 9,500-foot runway to change a "hairy" emergency decision into a relatively relaxed pilot judgment. There was a day when a pilot would have been torn between the almost sun guess that his trouble was only fouled plugs and the worrying knowledge that it could be valves or a cylinder failure portent of more serious things to follow.

There was a day, when 67 pas-sengers (or should I say, 21 passengers?) would have had to sit through that entire performance without word one from the cockpit. It is not hard to visualize what would have been in their minds: "What are those madmen in the front of this thing doing? Are they going to attempt another takeoff with this machine that so obviously has something wrong with it?" It is difficult to overestimate the importance of the P.A. system that links the captain with his passengers.

Later on this same flight another marvelous gadget came into play. With the magic of airborne radar we did a swivel-hips, broken-field running job through a sky full of thunderstorms. A cabin full of passengers that stayed relaxed. A cockpit full of crew that stayed relaxed. Wonderful!!

Looking back, this is a thrilling business that has made unbelievable progress. Looking ahead is different You tend to compare what we have with what could be and you become impatient.

The future is bright with the promise of more marvels to come There remains a wealth of new and better and safer ways of operating that haven't been brought into service. So we keep hammering at the many roadblocks.

TO CONSERVE OUR
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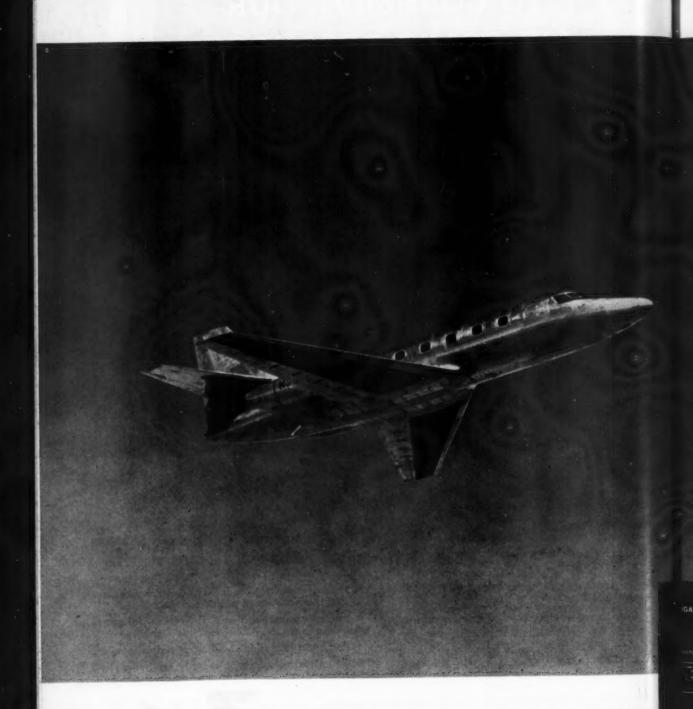
. . . provides all essential requirements for air traffic control:

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Bondix-Decca, originally developed in the United States, is the low frequency area-coverage navigation system. It is the only proven, extensively used system in the world. Growth potential allows unlimited automatic air traffic control improvement.

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the Answer to the Air Force's Urgent Need for a Jet Utility Trainer-Transport

Designed, built, and flown in record-breaking time, the new "economy size" Lockheed JetStar can perform the following missions (just as well as the big jets—and for only a fraction of their costs):

For ATC: The JetStar fills an indicated need of the Air Training Command for a "top-off" navigator bombardier trainer aircraft which more nearly equals the speed of jet bombers on operational duty. Cruising faster than 450 knots at altitudes up to 45,000 feet, the JetStar fills existing speed/altitude gaps between trainer and tactical aircraft in current use.

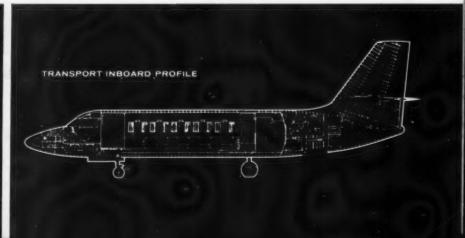
For MATS: The Aids to Airways Communication Service, operated under the Military Air Transport Service, is charged with the responsibility of airways inspection. The *JetStar's* high speed and altitude capabilities—comparable to today's tactical aircraft—will permit more thorough and effective airways inspections.

For SAC: The Strategic Air Command depends upon high speeds to rush high priority cargo from its headquarters to its retaliation bases. The new Lockheed JetStar can transport critical parts for bombers and navigation instruments to SAC bases—with jet speed (but at much lower cost than the big jets).

In addition to those above, the new Lockheed JetStar can perform many other essential military missions. Like all Lockheed planes the JetStar is easy to maintain, and has the inherent stamina to insure optimum utilization—qualities that are more important today in military aircraft than at any time in our history.

GEORGIA DIVISION, Lockheed Aircraft Corporation, Marietta, Georgia







CONTROLS FUEL MEASUREMENT AND MANAGEMENT ON THE CONVAIR 880

Simmonds PACITRON systems have been specified for the Convair 880, new jet transport which will soon be in service carrying more payload for the world's leading airlines. The PACITRON Fuel Gage System was chosen because of its light weight and successful record of reliability and accuracy.

In addition to accurate fuel measurement, the dependable PACITRON System can also provide control of fuel management functions, such as:

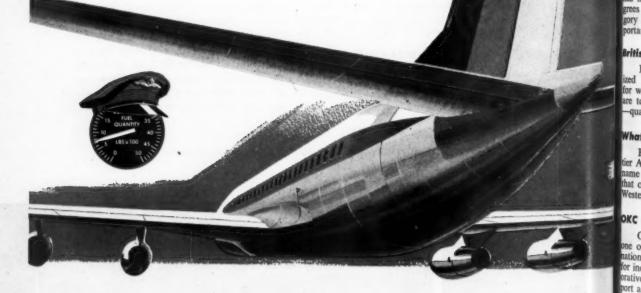
Load Limit Control-automatic control of fuel taken aboard in accordance with flight plan

Totalization-gaging of total fuel weight on board the aircraft

for control of valves and pumps.

Center of Gravity Control—automatic control of the distribution of fuel Level Switching—a means of providing signals at predetermined levels

The installation of PACITRON on the Convair 880 is continuing proof of Simmonds' leadership as "first in electronic fuel gaging."



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Alphabet scoop

Lear, Inc. has printed a booklet called "Aviation Alphabet Scoop," decoding 2,300 aeronautical abbreviations and prefaced by some amusing com-ment by Norman Warren, vp, who directs the company's advertising and public relations.

"Once upon a time a knowledge of English was all one needed to communicate successfully with the natives of the aviation industry," writes War-ren. But now has come the strange new tongue called "Acronym" because its vocabulary is formed by combining the initial letters or syllables of other words, as WAC for Women's Army Corps.

"The rate of word coinage in Acronym is prodigious," Warren observes. "Every day dozens of new formations appear . . . The abbreviation is created first, then the name. For mations appear . . The abbreviaexample, why else should the Van-guard project be christened 'Minimum Orbital Unmanned Satellite of the Earth' except to make it come out acronymously as 'MOUSE'?"

"Our list makes no pretense at being exhaustive," says Warren.

Acronym VIPI

It used to be that VIP (very important person) covered all dignitaries up to the President in service lingo. But Air Materiel Command at Dayton as had so many VIPs of varying derees of importance that a higher category has been added: VIPI (very important person indeed).

British weather: rather cool

British Air Ministry has standardized new meteorological terminology for weather reports: temperatures now are to be cold, cool, mild, warm, hot qualified by rather or very.

What's in a name?

Earl H. Passwater, dsm for Frontier Airlines at Phoenix, Ariz., says his name is always getting confused with that of T. C. Drinkwater, president of Western Airlines.

OKC caters to public

Oklahoma City airport terminal, e of the nicest and brightest in the ation, has a complete weather display for incoming passengers. There's a decorative weather map, local weather re-port and forecast, temperatures around he nation and temperatures of leading cities of the world.

Braniff's prize at Love Field

Biggest competition in any new airne terminal is who gets prize counter ocation In Love Field's new structure, Braniff opped the best position nearest

the hugh concourse. American got in second and Continental third. The local carriers are farthest away.

Expense report

At a time when Pentagon is screaming for lack of funds, bases of all services are telegraphing instead of writing to magazines for prices and orders. Amount of money that could be saved by all services on small things like this would pay for some big and useful military programs.

Route grants broadcast

Most route permits awarded to foreign airlines by CAB are accepted as routine because they are actually authorized ahead of time in bilateral agreements. But for U.S. propaganda purposes they are valuable items. Each time CAB grants a new foreign permit, it is broadcast to the world over the Voice of America.

What, no DC-4s?

When The Flying Tiger Line de-livered its last DC-4 to Pacific Western Airlines at Vancouver, it was the first time in 10 years the air freight carrier has been without a DC-4 in its fleet.

It's out to standardize 100% on its Lockheed Model 1049H Super Constellation equipment. It has only two routes left where it is operating C-46s
—Buffalo-Detroit and Philadelphia-Newark—and has put nine of the Curtiss planes up for sale.

Round-the-world with Qantas

Qantas Empire Airways is scheduling the 25,478-mile round-the-world flight at five days and two hours, including a seven-hour stop at London, for the Lockheed Super Constellations it will use starting in December. But when it gets its Boeing 707s on the run the trip will be three days and nine hours including a 20-hour stopover at London

Germans interested in F11F

Navy has six F11Fs equipped with GE J79 engines in a test program at Edwards AFB, but has no funds to procure the aircraft with this engine.

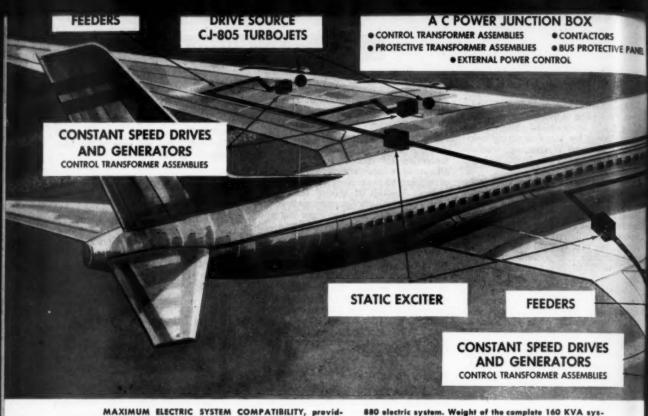
The Germans are interested in it as a land-based fighter. By removing the arresting gear and associated equipment, it could be made about 1,000 pounds lighter.

WWP gets an En Route sticker from Dallas



WAYNE W. PARRISH (left), editor and publisher of AMERICAN AVIATION, receives the first of 100,000 special baggage stickers promoting the new Dallas Love Field terminal, which opened recently. Making the presentation of the sticker and luggage is Rex Brack, vice president-sales of Braniff Airways. The special Braniff stickers will be distributed all over the world.

VIATIO



ing greater safety and reliability, will result from selection of General Electric as a one-source supplier for the Convair

880 electric system. Weight of the complete 160 KVA system is approximately 756 lbs. Of this total only 528 lbs are carried in the four engine accessory compartments.

Convair Simplifies 880 Component Integration by Selecting Complete General Electric 160 KVA System

By obtaining the complete system from prime mover to the bus from General Electric, Convair will greatly simplify the integration of 880 electric system components. Throughout all stages of development and testing, problems involving more than one item of equipment will be more readily resolved, allowing incorporation of the latest safety and reliability advances into a completely compatible electric system.

Even in the early design stage, advantages of the package electric system approach has paid dividends in time and cost savings. For example, a complete design study was made involving the characteristics of engine acceleration, tachometer output, constant-speed drive, generator and electrical controls to obtain proper engine starting time with a minimum of installation changes.

Another example of co-ordinated development is the designing of the automatic paralleling of the generators. In this instance, ready availability of constant-speed drive data allowed the design of paralleling circuits in the electric sys-

tem which will minimize weight, in addition to simplifying the system—all without creating excessive electrical disturbances. This and similar co-ordinated development tasks are accomplished within General Electric, prior to final recommendation to Convair.

In addition to the advantages of coordinated development, Convair's selection of General Electric aircraft electric system equipment simplifies incorporation of the latest component developments. Tailored to the new requirements of the advanced jetliner these proven techniques will contribute to:

GREATER SAFETY—Damaging overvoltages to any phase of the equipment are prevented by application of the highest phase takeover sensing principle in both the voltage regulator and overvoltage relay.

Another safety feature is the permanent magnet generator incorporated in each of the system's four statically excited generators. This generator furnishes control power completely independent of the main power system. Also, since the per-

manent magnet generator is used as a source of initial build-up, the generator when de-energized has less than one volt residual to feed a feeder fault.

Control relay, generator line, and butie contactors are all magnetically-held-type spring locked to the "off" position. This guards against loss of protection due to loss of power. In addition to the completely automatic protective system, the pilot is provided with a manual shut of to de-energize the electric system under emergency conditions. Here again reliability is not dependent on any source of electric power.

Added safety devices to be built into the hydraulic constant-speed drive include a malfunction detector, input disconnect, overspeed and underspeed devices, and an overrunning clutch.

HIGHER RELIABILITY—Use of the statically excited generator simplifies cooling of the rotor and windings and replace the rotating exciter with an inherently more reliable static exciter mounted in the aircraft wheel well. The permanent magnet generator provides initial build-

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up, eliminating delays due to loss of residual magnetism.

Magnetic amplifier control circuits eliminate critical adjustments of sensitive relays, decreasing the possibility of nuisance tripping. Only standard hermetically sealed relays, independent of environment and contamination, will be used. Simplicity of design, obtained by use of ball pistons, increases reliability of the

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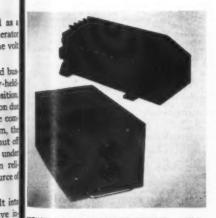
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NGHEST PHASE TAKEOVER SENSING—will be incorporated into 880 control panels for greater nitraft safety. The automatic protective tribam is independent of any power sources.



2000 HR bearing and brush life is effered by statically excited generators like this 40 KVA

model. 880 generator and control life will be 5000 hrs-maintenance at 2000 hr intervals.

General Electric hydraulic constant-speed drive. The design has a minimum of working parts with the majority of the stress limited to the five major transmission parts. The unit housing serves only to align the working parts and provide support for the generator.

IMPROVED PERFORMANCE—Improved voltage control with static excitation produces better performance of load equipment, particularly sensitive electronic gear. Time for return to normal voltage after application or removal of load is reduced as much as 40 per cent based on comparative tests of the same machine with rotating and static exciters. System stability is excellent and normal voltage is attained with little or no overshoot or undershoot. Fast build-up of current on application of faults reduces clearing time for load circuit breakers.

Measuring only 11 in. in diameter, 22¾ in. in length, and weighing just 132 lbs, the compact, lightweight combination of hydraulic constant-speed drive and statically excited generator saves engine accessory section space and reduces engine pad weight. This helps reduce aircraft nacelle weight and drag penalties.



INHERENTLY SIMPLE AND RELIABLE, ball piston, hydraulic constant-speed drive for the Convair 880 has an input speed range of 4300 to 7760 rpm and an output speed of 6000 rpm.

LOWER MAINTENANCE AND OVER-HAUL COSTS—The compact generator and constant-speed drive are easy to install and remove. The control panel includes all system control and protective functions, allowing "go-no-go" checkout and replacement of just one package during maintenance operations. No external adjustments are necessary.

Elimination of the rotating exciter in the generator does away with commutator undercutting and inductive neutral brush settings at time of overhaul. Static exciter parts should not need attention between major overhauls. All panel wiring is accessible for replacement and inspection before the final covers are secured.

Similarly, the constant-speed drive is designed for rapid tear-down and re-assembly. All parts are built to dimension, eliminating hand fitting or lapping-in of parts during overhaul.

For more information on General Electric aircraft electric systems, components and development capabilities, contact your General Electric Aviation and Defense Industries Sales Office or write for the descriptive brochures offered in the coupon below. General Electric Company, Schenectady 5, New York.

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TRANSPORT CHANGES

Andrew James Upton, Jr., cargo sales representative for Delta Air Lines' Cincinnati staff.

Paul Steuri appointed chef of United Air Lines' flight kitchen at Omaha, Neb. Russell Ellis promoted to supervisor of sales development in Washington for

Trans World Airlines.

William N. Seitz named Washington,
D.C., district sales mgr. for Braniff Air-

Robert T. Czerny appointed district sales mgr. for Bonanza Air Lines in Utah. Thomas J. Lane named cargo sales

mgr. in Los Angeles for American Air-

William J. Grant appointed sales mgr. for Western Air Lines for Las Vegas,

Charles L. Baker named asst. to the vp-operations of Trans-Texas Airways.

Samuel F. Leib named mgr.-interline airfreight sales for American Airlines.

George Nelson Crabbe promoted to post of ground service mgr. for Hawaiian Airlines at Honolulu International Air-

Robert K. Lange named passenger service supv. for Hawaiian Airlines, Hon-

olulu Airport.

Charles Cornelison appointed gen. sales agent for Air-Land Freight Inc.

Dorothy O'Donnell named mgr. of new Air France office in Los Angeles.

Jane Parmenter named sales div. mg. of administrative procedures for Western Air Lines.

Christopher Spurrier appointed Brish West Indian Airways' mgr. in Jamaica Len F. Smalley appointed Canadian Pacific Airlines' operations and traffic mg

in Hong Kong.

HONORS

Peter Duyan, Jr., chief electrical engr., Douglas Aircraft Co., has been nominated for the presidency of the Air-craft Electrical Society for 1957-58.

D. Roy Shoults, gen. mgr. of General Electric Co.'s Aircraft Nuclear Propulsion Dept., has been named to the Atomic Energy Advisory Board for the

State of Ohio.

Col. John P. Stapp (USAF, MC)
was awarded the Gorgas Medal by the
Military Surgeons "for Association of Military his studies to determine the maximum

limits of emotional and physical shock that the human body can stand."

Ruben M. Berta, president of VARIG Airlines of Brazil, has been named to the executive committee of the

International Air Transport Assn.

George Nelson, of Wyoming, was elected president of the National Association of State Aviation Officials.

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Airborne Variable Displacement Piston Type Pumps



A NEW LINE of Vickers Variable Displacement Piston Type Pumps is now available for aircraft applications at 4000 psi pressure. These new pumps have the same exceptionally high overall efficiency as well as the many other performance advantages demonstrated by the 3000 psi Vickers pump series throughout millions of hours of dependable airborne service. Flow characteristics and maximum recommended speeds are also the same for both series.

An important feature of the 4000 psi series is a CONTAMINANT. TOLERANT DESIGN enabling successful operations in hydraulic fluids and engine lubricating oils with particle sizes up to 40 microns.

Operation of airborne hydraulic systems at 4000 psi is finding increasing favor because it means smaller actuators and less fluid in the system . . . resulting in an overall weight and space advantage.

Vickers 4000 psi hydraulic motors and fixed displacement pumps will also be available. For further information about 4000 psi pumps and motors, please write for Bulletin A-5219 or get in touch with the nearest Aero Hydraulics Division office listed below.

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PEOPLE

Two top assignments in the Navy Bureau of Aeronautics were filled recently by RAdm. R. E. Dixon, left, and RAdm. W. A. Schoech. Admiral Dixon is the BuAer Chief and Admiral Schoech is deputy chief.





Lt. Gen. Sir John Evetts, center, manager director of Rotol Ltd. of Gloucester, England, discusses announcement of formation of Rotol, Inc. as an American subsidiary to support Rotol propellers on U.S. equipment (including Fairchild F-27, model shown) with Jack Staples, Rotol. Inc. president, left, and Vernon G. Grudge, director of Rotol, Inc., right.



Raymond H. Rice, left, North American vice president and general manager of Los Angeles Div., briefs Jack J. Jones, recently appointed NAA's weapon system manager for the WS-110 project.



Fifty years of airline flying is represented by TWA pilots, twin brothers Capt. M. C Williams, left, and Capt. L. M. Williams, second from right, who received 25-year service pins from TWA president, Carter L. Burgess, second from left, and operation vice president Frank Busch. The twins joined TWA in September 1932 and hard since flown a combined total of nearly 50,000 hours, about 10 million miles.

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VP. Grand Central Rocket Co.
Asst. vp-operations, Grand Central Rocket Co
Gen. mgr., Electronics Div., Elgin National Watch Co
VP-Research and engrg., Texas Instruments, Inc
VP. California Technical Industries Div., Textron Inc.
Weapon system mgr., North American Aviation's WS-
110 program

VP. Kelsey-Hayes Company
Mgr. sales and planning, American Machine & Foundry Co.'s Turbo Div.
Chief engr. Topp Mfg. Co.
Secy. and corporate counsel. The Garrett Corp.
Dir. New Products Dept., Goodyear Tire and Rubber Mgr. Hydraulies Div., Dalmo Victor Co.
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Mgr., West Coast operations, Grand Rapids Div.,

Lear, Inc.

Mgr., product adv. and sales promotion, RCA Electron Tube Div.

Mgr., adv. services RCA Electron Tube Div.

Mgr. adv. and sales promotion—semiconductors and components, RCA Electron Tube Div.

Former Position

Consultant to Gar Wood Industries Deputy sales mgr.

Pres. and chm. bd., Cal-Air Engineering, Inc.

VP-finance and administration Plant mgr. Designer, Third Stage Vanguard concept Designer, Find Stage Vanguard et Dir. engrg. and research Gen. mgr., Star-Kimble Motor div. Head, Industrial Instrumentation di Asst. chief engr., Remier Co., Ltd. Asst. vp, Contracts Div.

Dir. plans and programs, Missile Development Div. Pres., Heintz Div.

Military sales rep., Hughes Aircraft Corp. Project engr., Servomechanisms Inc. Corporate counsel and asst. secy. Mgr. chemical materials, products development Mgr. Agst. to pres.
Chief engr., Century Engineers, Inc.
VP, Century Engineers, Inc.
VP and gen. mgr., AlResearch Industrial Div.

Head, electronics Chief, weapons delivery section Asst. chief

Field service engrg. supv., West Coast

Engineer VP, Ross Operating Valve Co. vP, Ross Operating valve Co. Sales mgr. Asst. sales mgr. In chg., facilities planning, Guided Missile Div., Convair-Pomona Convair-romains Service mgr. Chief, development section Dir. sales, West Coast Asst. sales mgr. VP-operations

Head, Supersonics Div. VP-finance VP-personnel

Special sales rep., Semiconductor Div.
Aviation and Defense Industries, Apparatus Sales
Div.
Mgr. assembly and spare parts
Mgr. rubber market development
West Coast mgr., Electronics Corp. of America
Vice president

VP and gen. mgr., Tracerlab, Inc. In R&D, International Telephone & Telegraph Corp.

British engr. VP, Fairchild Engine & Airplane Corp. and gen. mgr., Guided Missiles Div. Bomb design authority

Chief development engr.

Mgr. entertainment adv. and sales promotion Administrator, budgetary and cost controls

Administrator, adv. and sales promotion—semi-conductors Administrator, publications

Group leader, missile projects VP-sales, Cambridge Thermionic Corp. Dir. sales, West Coast

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Asst. regional operations officer, American Airlines
Asst. vp-customer service, American Airlines
Dist. publicity mgr., United Air Lines, Hawaii
Gen. mgr., customer relations, Trans World Airlines
Resigned

VP-finance
Dist. mgr. Greater Antilles, Jamaica
Asst. to the vp-operations and maintenance
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Townsville: I tangle with red tape

WELL FOLKS, let's get out of New Guinea where I had had a wonderful three days and get back down to Sydney.

After having left my mark on Darwin a little earlier, wouldn't you know that I'd run afoul of the authorities in a place called Townsville?

Just happened I was on the first slight of a new schedule which called for going through customs and immigration at Townsville rather than Brisbane. Those of you who flew out there in World War II will remember this pleasant little town on the far northeast coast. It was a busy transient point through which all air traffic to and from the war area to the north filtered.

I was on a Qantas DC-4 and Capt. Richard Feathers, a friendly bloke who had flown the Pacific for BCPA for six years prior to the BCPA-Qantas merger, gave me some good cockpit views of a part of that fantastic thousand-mile Great Coral Reef which is one of the less-accessible wonders of the globe. Our plane was well-filled with Aussies returning to the home country, including a lot of women, babies and kids.

Utter chaos

It was a big occasion for Townsville and all the customs and immigration officials of the area had been rounded up to process this first plane load. For the life of me I couldn't understand why there was so much red tape for Australians returning from an Australian-mandated territory, but I recall how some years ago we were doing the same thing to our own people coming back from Hawaii, Alaska and Puerto Rico.

Anyway, here was a section of the terminal all set aside for us outlanders, separated from the other sections by ropes. Everything was makeshift. There weren't enough seats in the first place, but on the other side of the barrier were plenty of tables and chairs so I looked forward to getting through customs and immigration and moving about a little.

You never saw such chaos in your life except on bad days at Idlewild and Chicago. There was no place to lay out the baggage and the paper work was enormous and it took a lot of time before the local officials began calling off the names. Meantime the stewardess was serving tea and cookies and the place became bedlam, what with squalling babies and diaper-changing and shouts of people and officials.

At long last my name was called and I managed to convince the immigration

bloke that I was not a Red Chinese spy and so I felt that I was formally accepted into the country.

Naturally the next thing I did was go around the rope barrier and wander into the main terminal to buy a couple of newspapers and a Coca Cola. Then I sat down at a table and proceeded to enjoy the remainder of the hour and half stop.

The law says ne

But no sooner was I nicely relaxed and reading the news when a local official came up to me and told me I must get back on the other side of the ropes where bedlam continued in a well-sustained manner.

"Now why should I do that," I asked in my most kindly and patient voice. "I have been accepted into the country. I'm now in Australia. I'm free to move about. I've satisfied the authorities. I'm cleared. I have just purchased some newspapers. I now have a seat away from the mob. Just give me one reason why I should go back into quarantine."

"You wouldn't understand the reason if I told you," the local authority replied. "What you mean is that there is no real reason." I said.

His reply to this really set me back.
"I don't know what the reason is,
but I've got my orders."

So there it was. The very essence of bureaucracy and petty regulations and red tape all boiled down to the simple defense of all baffled law enforcers—"I've got my orders." A principle was involved. I had been cleared. But somebody had told this bloke to keep everybody behind the barrier, cleared or not, so he was doing his duty.

And so I obey

Not wanting to risk being sent back to New Guinea or perhaps to Darwin, I left this fine area of chairs and tables, and went back to the bedlam where no seats were available. And do you know, not another passenger was able to buy a newspaper or a cold drink or a souvenir or cigarettes during the long stop?

Let's grant that the customs and immigration boys were new on the airport job, but I felt a sense of frustration as I did more than once in Australia that nowhere could be found one guy with guts who would cut red tape. There seems to be a boldness lacking down there. The stupidity at Townsville was no different than that found in the U.S. and every

other country of the world except that in many areas there is somebody who has the courage to put a stop to the nonsense. If I had been an Aussie I would have made a real issue out of it. As a visitor I was satisfied to get an admission from the guard that he was an oaf for following orders blindly in the face of a well-established principle that once you have passed quarantine you don't have to return to it.

Ah, well, back on the DC-4 for the remainder of the long 2,000-mile haul to Sydney via Brisbane which, incidentally, has an excellent loudspeaker system in the terminal. We had left Lae in mid-morning. It would be after midnight before reaching Sydney.

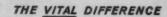
Qantas gets an orchid for passing out cold face cloths in the humid areas. Really refreshing. The stewardess was Norma Firkin, who seemed like an awfully austere and forbidding babe on the first part of the trip, but by the time we reached Sydney I was willing to give her an AA Plus for doing a highly professional job. It isn't an easy trip to handle, but there are a couple of stewards to help out.

One-night stand

Well after midnight we got into Sydney and I went to the Wentworth Hotel with the crew and got some sleep. I had spent half a day in Sydney some days earlier. Now I was doing better. I had the remainder of one night and almost all of the next day, but a long lunch period was taken up as the guest of the Qantas staff and I talked in formally about the airline business in the U.S.A.

It was not my lot to see much of Sydney. By pre-arranged Qantas itinerary, out I went on a late afternoon plane of Australian National Airways for a one-night stand in Melbourne. And do you know, I was on another DC-4! After having already traveled 6,000 miles on DC-4s since arriving in Darwin I began wondering if there was any modern equipment in the country at all.

And what a trip it was! After a so-so meal, unable to read much because of the poor lights, we entered one of the fiercest, roughest electrical storms I've ever been in. A lot of violent lurching and buffeting. One passenger opposite me was so deathly ill he had to be assisted off the plane at Melbourne. On landing I learned the same storm had passed through Melbourne earlier and had caused considerable wind damage.



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